The Builder.

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Meeting of the Art-Union of London.

BEFORE the hour appointed for the meeting of this association on Tuesday last, for the reception of the annual report and the distribution of the funds subscribed for the purchase of works of art, the new Adelphi Theatre was well filled with an elegant and attentive audience, and the stage almost inconveniently so. Amongst the members of the council present were Mr. Antrobus, F.S.A.; Mr. Bennoch, F.S.A.; Mr. Butterworth, F.S.A.; Sir Thos. Gabriel, bart.; Mr. Chas. Hill, F.S.A.; Mr. R. Hudson, F.R.S.; Mr. Chas. Mayhew; Mr. L. Pocock, F.S.A.; Mr. Zouch Troughton; Professor Westmacott, R.A.; and others; and amongst the visitors were Mr. W. E. Frost, A.R.A.; Mr. Maclise, R.A.; Mr. Jas. Fahey, and other well-known artists. In the absence from England of the president, Lord Houghton,—

Professor Westmacott was called to the chair, and having explained the circumstances under which he took it,—

Mr. Godwin, F.R.S., read the following

REPORT.

The Council are glad to be able to commence the thirty-second annual Report of the proceedings of the Art-Union of London with an announcement of its continued prosperity. The subscriptions for the present year amount to the sum of 13,612*l.* 14*s.* 6*d.* The engraving to which each subscriber is entitled, "The Play Scene in Hamlet" (after Maclise), has been received on all sides with the greatest approbation, and the periodical press have echoed the good opinion of the public. It could scarcely be otherwise. The cost of such a print under ordinary circumstances would be at least two guineas, and a large part of each subscriber's guinea will nevertheless come back to the body of members in the shape of prizes.

Various other engravings of great importance are in progress, as the members of the Society already know; and in addition to these Mr. W. Holl, who engraved the "Merrymaking," has been commissioned to produce a plate in his best manner after the picture "Rebekah," by Mr. F. Goodall, R.A.

Mr. Vincent Brooks has made for the Society a chromo-lithograph from a charming picture by Mr. Birket Foster, called "The Kite;" examples of which, framed, will form part of the present distribution.

The Council have in hand for next year a copy in chromo-lithography of Mulready's well-known picture "Choosing the Wedding Gown,"—one of the most attractive paintings in the South Kensington Museum. "I had scarcely taken orders a year," says Goldsmith's immortal "Vicar of Wakefield," "before I began to think seriously of matrimony, and chose my wife as she did her wedding gown,—not for fine glossy surface, but such qualities as would wear well." On this observation the picture is founded. Mulready's works depend so greatly on *colour* for their effect that they are peculiarly suited for production in chromo-lithography. If real artistic feeling and careful manipulation are brought to bear on such a work, a very satisfactory result may be looked for; and as we cannot all afford to have a "Mulready," or "Birket Foster" at 1,000 or 500 guineas each, we may be very glad to get a faithful transcript of it for *one*. Unfortunately the flood of glaring offensive attempts in this line seen in the shop-windows tends to induce a feeling against this mode of reproduction. The Art-Union may, however, point to the "Young England," after Fripp, "Wild Roses" and "The Kite," after Birket Foster, as examples which none but those constantly in the habit of examining such works are able to distinguish from the originals. In the case of Mulready's picture above mentioned, there will be from twenty-seven to thirty stones employed to print as many colours, and the great care and skill required in "registering" may be imagined, since, of course, the deviation, but by a hair's breadth, in placing one colour over another would be at once fatal to the whole work, and render useless all the previous paintings.

Turning to another department,—

Mr. Leonard Wyon has successfully completed for the Society dies for a medal of the late Sir Richard Westmacott, R.A., sculptor, impressions from which will be allotted on the present occasion.

Mr. W. F. Woodington, one of the artists engaged to model the bas-reliefs on the base of the Nelson column, has prepared an exact copy of this monument on a scale of 1-7th in. to the foot; and copies in bronze, executed by Messrs. Franchi, will form part of the prizes.

A vacancy in the council, caused, soon after the last meeting, by the lamented death of Edward Hawkins, esq., late of the British Museum, was filled by the election of the Right Hon. Sir Thomas Gabriel, bart., then Lord Mayor of London. Mr. Hawkins was a member of the first council of the Society, and gave constant and valuable assistance for many years.

The Right Hon. T. Monsell, and Peter Graham, esq., have been elected members of the council in place of Philip Hardwick, esq., R.A., and Chas. Leaf, esq., who retire in accordance with our by-laws.

The following is an outline of the receipts and expenditure.

A detailed account, duly audited, will be printed hereafter, as usual.

Amount of subscriptions		£13,612	14 6
Cost of engraving and printing "Hamlet" plate, reports, almanacks, exhibition, and reserve of 2½ per cent. ...	£5,155	11	0
Agents' commission, rent, salaries, postage, &c.	2,232	2	9
Amount to be expended in pictures, brouzes, parian, &c.	6,225	0	0
Total		£13,612	14 6

The amount available for the purchase of works of art from the public galleries by the prizeholders themselves will be divided in the following manner:—

23 works at	£10	each.
20 "	15	"
12 "	20	"
14 "	25	"
12 "	30	"
12 "	35	"
10 "	40	"
6 "	45	"
8 "	50	"
6 "	60	"
8 "	75	"
3 "	100	"
2 "	150	"
1 work at	200	"

There will also be distributed,—

25 Bronzes of the Nelson Column.
20 Medallion Bronze Inkstands.
100 Statuettes, "The Wood-nymph."
250 Chromos, "The Kite."
30 Silver Medals, commemorative of Sir R. Westmacott, R.A.

There will therefore be, with the parian busts, given to all who have subscribed for ten years consecutively without gaining a prize, 758 prizes, in addition to the engraving received by every member.

On the plan followed on other occasions, the smaller prizes will be allotted by numbers drawn from the wheel, in the same manner as the picture prizes; but as the drawing of these would occupy more time than the business of the theatre would allow, the drawing will take place at the office to-morrow morning, at eleven o'clock, when any members desirous of being present are invited to attend.

The reserved fund now amounts to £14,478.

One of the galleries from which prizeholders have been allowed to select—that of "The British Institution for Promoting the Fine Arts"—is no longer open. The casual intimation that has reached the public, that this Institution, which was founded in 1806, has ceased to exist, is felt to be unsatisfactory. The British Institution has done good service, as well in bringing artists and the public together, and by the rewards bestowed on rising men, as in its periodical gatherings, and exhibitions of the fine works of the old masters which are scattered over the kingdom, and are not otherwise to be seen; and the art-loving public had a right to expect an authoritative statement of the position of the Institution, and the opportunity to assist in preventing its disappearance.

The painters of past time are still "masters," and the present generation cannot afford to give up the study of them. A moderate acquaintance with the wondrous masterpieces of former times, should teach us humility. How is it that the works of Raffaelle and Leonardo da Vinci remain unapproached,—seem still unapproachable? And who could estimate the debt that humanity owes to these men? What steps should a nation take with the best chance of developing similar powers? This is an inquiry worth making,—and at some cost, too.

It has been contended again and again in the reports annually made to you, and at a time when it was needed, that a slavish copying, alone, of Nature (the power of drawing having once been acquired) is not the course that will produce great artists. Every really great work of art is ideal: it sets forth the idea of the producer, the mind of the workman,—a striving after the best,—as well as the material objects sought to be represented. The sentiments and feelings of the human mind are the subjects the artist must deal with who would leave behind him works that will move, enthral, and influence human kind.

Following the course adopted at intervals on previous occasions, and which assisted in bringing before the public, early in their several careers, Mr. F. R. Pickersgill, R.A., Mr. Henry Selous, Sir J. Noel Paton, Mr. John Tenniel, Mr. W. Cave Thomas, Miss Pistrucci, Mr. Hancock, Mr. H. H. Armstead, Mr. W. Calder Marshall, R.A., and other artists now well known, the Council in September last invited a competition in designs. The sum of 300 guineas, with a further sum of 100 guineas, if a production of very high character were submitted, was offered for a series of drawings, illustrating some poetical or historical work of a British author, or events in British history; the series selected for the premium to become the absolute property of the Art-Union, with copyright. In response thirty-five sets of drawings have been received, several of them being works of great merit. With the obliging permission of the Committee of Privy Council for the Department of Art, the whole of these designs will be exhibited to the public in the South Kensington Museum in the course of next month, and the decision will then be announced.

With reference to a previous set of illustrations issued to the members, "The Ancient Mariner," the Council have assented to the request of a photographer for permission to produce photographs from those plates, for the purpose of illustrating by the magic lantern a reading of the poem about to be given in various country places. The arts prompt each other. A further instance of this is found in the circumstance that Mr. J. F. Barnett was led to compose his successful cantata, "The Ancient Mariner," first produced at the Birmingham Musical Festival, by turning over our illustrations of the poem which made its capabilities apparent to him.

In the latter part of last year your Council, as representatives of the Society, were entertained at the Mansion House, by the then Lord Mayor, Sir Thomas Gabriel, an incident that should scarcely go unrecorded. In proposing as a toast the success of the Art-Union of London, the Lord Mayor dwelt effectively on the part that had been played by the Society in ministering to the gratification and advantage of the community,—in improving taste, and aiding artists. By bringing within the reach of all classes choice specimens of art, thus familiarising the public with things of beauty, it had helped the growth of the appetite for them by the things it fed on. If ever the labours of this Society were necessary, they were so at this time; for nothing, he maintained, could enable us, as a nation, to keep our place among the manufacturing countries of the world but a thorough education, and training of the people in all that belongs to the arts. A love for the beautiful was innate in human nature, and the rudest savage would prefer a decorated and well-proportioned tool or instrument to a rough, ugly article; but, if this were true in that class of manufacture, how much more so was it with reference to all those productions of every class required to meet the luxurious taste of the day incident on the vastly increasing wealth of every country. We might therefore depend upon it that if we wished to avoid seeing ourselves altogether distanced in the manufacturing of all articles in which anything like taste could be introduced, and left as the manufacturers of only coarser works, we must diligently do all that tends to improve and raise the taste of our people.

One of the Honorary Secretaries, in replying to the Lord Mayor, referred to the eventful career of the Society, and claimed that when the history of the progress of art in this country should be fairly written, it would be found that the Association had played no unimportant part. The early progression of it was remarkable. When Mr. Henry Hayward, Mr. Lewis Pocock, Mr. Bond Cabbell, and himself, the only four of the founders remaining in the Council, had sat down at a small table in a small room first to organise it they had hardly expected such a result as had followed. Scarcely able to obtain a subscription of 500*l.* in the first year, it soon became 1,000*l.*, then 2,000*l.*, 5,000*l.*, 12,000*l.*, 14,000*l.*, and so mounted to nearly 18,000*l.*, after which it subsided to a comparatively steady income of from 12,000*l.* to 14,000*l.* a year. About 350,000*l.* had been raised by its means, the whole of which large sum, with the exception of the necessary expenses for rent, printing, and so forth, had been devoted to the encouragement of artists, and the dissemination of works of art. All over the kingdom, in every colony, wherever, indeed, English men and women were to be found, whether in China, India, Barbary, Egypt, Russia, Turkey, New Zealand, or the gold diggings of Australia, the Art-Union had a colleague engaged in the dissemination of works of art. It was surely no small thing thus to have spread over the world an associated brotherhood interested in the progress of the arts that ennoble and refine. Looking round the hall in which they were assembled, the speaker said, he was reminded of a member of their council, the late City architect, through whose endeavours mainly the corporation had been led to aid nobly the sculptors of the country, by filling the niches of that apartment with their works. It was to be hoped that before long the corporation would be led to call in the aid of the sister-art, painting. Strange to say, there was not a single picture in that Mansion House of the richest city in the world. He hoped he might not be thought impertinent for mentioning it: at any rate, it was a fact not to be proud of, and ought to be remembered. For many years the reports of the Art-Union have urged the desirability of placing works of art on the walls of public meeting-places, and where they might delight, appeal to, and influence the multitude. Public galleries of works of art in our provincial towns were greatly needed. In most French towns, as at Rouen, Caen, Lyons, Lille, Bordeaux, there are galleries of art to which the public have free access: it is surely not creditable to us,—it is not wise, even commercially, that, with the exception of those in the three capitals, no such collections are to be found in England. Liverpool, prompted by a right spirit, determined some time ago to erect a building and found a public gallery of works of art. An examination was made of the best galleries at home and abroad, and plans were prepared. It appears, however, that on the ground of commercial depression the development of this excellent determination has been postponed for a time. It is to be hoped this time will be very short. The appropriation to such a purpose of some part of the immense revenues of Liverpool will be a most profitable, important, and praiseworthy step.

The Corporation of Manchester have recently determined on the erection of a new Town-hall at the cost of more than a quarter of a million of money, and, assisted at different stages of the selection by the advice of two members of your Council, have fixed on a design which promises to result in a building of great magnificence. The expression of a hope that sculpture and painting of the highest excellence obtainable will be enlisted for its adornment, may not be thrown away.

It is a subject for congratulation that sculpture to a considerable extent is to be introduced in the external adornment of the new building for the University of London, Burlington Gardens; though as much can scarcely be said in respect of the whole proceedings on this fine site. Instead of three separate buildings without congruity, under three different architects (one of the buildings—namely, that for the Royal Academy—tacked on to an existing structure), a noble and harmonious pile might have been erected that would have done something more than supply fitly the wants of the various bodies that are to be lodged there.

The Thames Embankment now approaching completion not merely affords good opportunity for the introduction of high-class sculpture, but absolutely demands it. Let our artists, then, prepare themselves for coming tasks. Statues have recently been set up in Westminster Hall, and there seems to be a disposition elsewhere to employ sculpture to a larger extent than heretofore.

Some works of this art have been long in hand. Many years have elapsed since the country voted a sum of money for a monument in St. Paul's to our great commander, the Duke of Wellington, and as yet even the model is unknown. With whom rests the fault, with the

authorities or with the artist who is commissioned to produce the work? It is time that a specific answer to this inquiry was demanded and obtained.

Views long urged by your Council are now widely held. Statesmen, churchmen, manufacturers, artisans, are alike crying out for increased efforts to raise the appreciation of beauty, and insisting, as for the masses of the people, that there is a direct tendency towards moral good and towards religious good in developing, as against the lower and more directly sensual parts of our composite nature, those higher faculties which God has given to us.

Improved teaching and greatly-enlarged opportunities of seeing and studying works of art are the chief things called for. The selected artisans who, under the auspices of the Society of Arts, visited last year the Paris Universal Exhibition, speak strongly in their reports of the advantages long enjoyed by French workmen in having easy access to collections of artistic productions, and express their anxious desire for the establishment of museums in various parts of the country. One of the reporters writes thus ably on the subject:—

"In the streets of Paris objects of art in some form or other are ever present to the eye. Statues, fountains of exquisite design, and public buildings with sculptured enrichments. While the ordinary street architecture is of an ornate character, presenting artistic features of a very high order, turn where you will you are beset by art, and from it there is no escape. The study of art in such a place must of necessity commence at a high level. But in London and many of our manufacturing towns the case is wholly different: in these places the influence of art is scarcely felt, the majority of the public buildings serve rather as examples of what to avoid than as stimulants of the general taste; and artistic inspiration, whilst surrounded by so much ugliness, is utterly impossible. With such an aspect as London and other of our cities present, it is vain to expect much advancement in the general appreciation of art: it is hoping against hope, for it is only by external works that the public can be reached and educated into becoming the patrons of that art which it is the object of our schools of design to develop; the encouragement of the latter without the former is folly, and must end in disappointment.

It is satisfactory to find that by the efforts of individuals and with the aid of the Government, a museum is about to be formed at Bethnal Green for the East of London, where, up to this time, little but stern necessity has been administered to. In Leeds an important Exhibition of Works of Art is about to be opened in a costly building only just now finished,—the new infirmary for that town. This will include fine works by the old masters (drawings as well as paintings), a gallery devoted to the productions of modern foreign artists, a remarkable selection of illuminated MSS., and a museum of ornamental art, wherein the works of the Celtic, Anglo-Saxon, Norman, Mediæval, and Renaissance periods will be set forth so as to give a striking view of the progress and vicissitudes of the various branches of ornamental art up to the close of the eighteenth century.

Exhibitions of this kind educate the eye, and, through the eye, the hand of the workman, and beyond that assist greatly in forming public taste, on which depend the demand for artistic skill and its proper direction. A natural right appreciation of works of good art,—the power to see beauty (and the production of beauty is the first purpose of art), is given by nature to very few;—the power to produce that beauty to fewer still,—here and there one. These are the exceptions, the geniuses; and it is not for these, the heaven-endowed units, but for the thousands who, without cultivation of the faculties they possess, would be unable to perceive it, that schools of art, museums, Art-Unions, and other means of enlightenment, are needed. Genius may find its own way, and exhibit itself. A modern writer may be right when he exclaims,—

> "Talk not of genius baffled;
> Genius is master of man:
> Genius does what it *must*;
> Talent does what it can."

But, that talent may have fair play, and that the scope of its "can" may be enlarged, the means of development must be afforded. Individuals in the disposition of their property by will might often, without injustice to connexions, contribute to the public pleasure and public progress. Love of our native place is largely entertained and talked of. How few show the love by adorning the place; or while leaving tens of thousands, often to those who do not want them, ever think of setting by even a few hundreds for a mural painting in the town-hall, or a marble group in the market-place or public recreation-ground, honouring some noble quality, and so prompting to its attainment.

The recent gift by a well-known water-colour artist, Mr. Absolon, of a dozen large pictures for the adornment of one of the sick-wards of Guy's Hospital, deserves to be widely known. Thousands of the suffering occupants of the ward, it may be anticipated, will be interested and cheered by them. Let us hope, not merely that the example may be followed by other artists (and artists have never been behind-hand in such works when the opportunity arose), but that the guardians of public buildings generally may be led to consider how they may best bring in art for the adornment of such places; art open to all; art that will delight and elevate. If the actualities of life be, as they are to hundreds of thousands, dark, narrow, and mean; if multitudes exclaim or feel,—

> "We are sepulchred alive in this close world,
> And want more room,"—

the arts that have the power to lead us to the shadowy confines which divide the real from the unreal, open a door for escape, and provide wings for the mind to wider and purer realms.

GEORGE GODWIN, } Hon. Secs.
LEWIS POCOCK, }

The Chairman, in moving the adoption of the report, described the purposes of the Association, and urged strongly those who were about to select prizes to use the greatest care in doing so. A knowledge of art was not intuitive: it must be worked for; taste must be cultivated. The fact that a work of art pleased an individual was no proof that the work was good; the capability of the individual to judge must be known before that could be said. It might reasonably be hoped that the acquisition of good works, for which the Art-Union of London gave every one the means, and the spreading abroad of fine engravings, tended to foster a taste for art. He thought the country must acknowledge a debt of gratitude to the Art-Union for the benefits it had conferred in that direction. The Chairman spoke at some length of the ignorance of art that prevails even in high places, and the want of instruction in it at the Universities. In concluding his address, he said he thought it well worthy of mention that not a single member of the governing body of the Society received a sixpence in the way of payment for his exertions in promoting the interests of the Art-Union.

Sir Thomas Gabriel seconded the resolution, and observed that he thought the constitution of the society would be injured by a system which enabled the council or a committee to choose works of art for the prizeholders, instead of allowing them to select for themselves. The mode was working well, and in all ranks art was much more thought about and spoken about than was the case some years ago. It should be always remembered that in the Art-Union all gained. Each had an engraving or book worth more than the guinea subscribed, and besides that the chance of obtaining one of the more costly works of art which the surplus funds enabled them to buy.

Mr. Charles Mayhew moved a warm vote of thanks to the Honorary Secretaries for their long-continued labours, which was seconded by

Mr Butterworth, and carried unanimously.

Mr. Godwin, in acknowledging the warmth with which the motion had been responded to, said it was the last time he should see them in his present capacity. He had worked for the Art-Union and the object it had in view two-thirds of his life with all his heart; but he felt forced now to give up this duty. He had worked, as the Chairman had said, without fee, but not without reward, the reward which was found in the belief that good had been done.

Mr. Lewis Pocock, in the course of returning thanks, said he, too, had sometimes reflected on the necessity of resigning his office; but he would not then state more on the subject.

On the motion of Mr. Bennoch, seconded by Mr. Pocock, a vote of thanks was passed to Mr. Benjamin Webster for again granting the use of his theatre, and to Mr. John Kinloch, the treasurer of the theatre, for his active co-operation.

The ballot was then proceeded with, the prizes being drawn by Miss Rich and Miss Verity (Wealth and Truth). The following is

A LIST OF THE PRINCIPAL PRIZEHOLDERS.

200*l.*—Bees, S. G., Bristol.

150*l.*—Hunter, R., Upper Holloway; Must, T., Portland, Victoria.

100*l.* Brown, T., South Carlton; Dolman, Mrs. H., Greenwich; Shand, A., Liverpool.

75*l.*—Barrett, G. Wintershall; Farmer, G., Colchester; Garrard, A., Whitehall-place; Perry, J., Stratford; Stephenson, H. P., 15, Abingdon-street.

60*l.*—Bright, E., Brighton; Green, Samuel, Kentish Town; Hawker, W. C., Islington; Lockhart, L., Loughborough-road; Mackenzie, C., Edinburgh; Scott, G., O.F.S., C.G.H.

50*l.*—Barber, S., Old Ford; Cottrell, J. M., Brixton; Edwards, G. C., Mincing-lane; Godwin, H., 11, Pelham-crescent; M'Donald, A. C., Geelong; Matthew, J., Dundee; Michaelson, E. P., Trinity College, Cambridge; Valentine, J., Walworth.

45*l.*—Bruse, W., Mount Brian, South Australia; Groom, D., Plymouth; Huffton, R., Birmingham; Hughes, W. H., Chapel-street; Luer, C., Arundel-wharf; Shelston, Miss L. B., Wraysbury.

40*l.*—Baker, W. G., Pietermaritzburg; Bell, M. P., Glasgow; Bennett, W., Melbourne; Clifton, W., jun., Lynn; Edwards, W. L., Bangalore; Harris, Miss F., Alexandria; Hills, E., Cranbrook; Lawrence, Mrs., Camberwell; Thornton, Dr., Dewsbury; Turtle, E., Ryde.

35*l.*—Bouchart, J., Adelaide; Clark, H. F., Great Western Railway; Hudson —, Brigham; Joyce & Son, Water-lane; Malcolmson, T., Clonmel; Miller, Lieutenant-Colonel, Ashton; Robertson, J. H., Glasgow; Thornton, E. M., Brook-street; Tomlinson, F. W., Leamington; Tindal, T. W., Esher; Windle, R., Bank of England; Wright, W., Runcorn.

30*l.*—C. O.B., London, Canada; the Dean of Chichester; Fraser, J., Nelson, New Zealand; Gillingham, A. G., Clapton; Hood, P., Montreal; Jeffrey, W., Great Russell-street; Moses, Mrs., Ulster-place; Muzio, J., sen., Highbury-grove; Silva, Campos, Oporto; Skinner, J., Holborn-hill; Summers, Matt., Redhill; Vacher, H. P., Teddington.

25*l.*—Albury, J. G., Melbourne; Astwood, —Hamilton; Bayliss, Mrs., Croydon; Cameron, H. F., Geelong; Clutton, W., Bungay; Crawshaw, R., Halifax; Divers, F. J., Blackwall; Don, R., Broughty Ferry; Flint, R. W., Canterbury; Gearing, Ann, Lechlade; Keeble, H., Wilson-street; Poncon, Mrs., Epsom; Robjohns, W., Tavistock; Wyatt, J., Markham-square.

20*l.*—Farmer, J., Basinghall-street; Fraser, W. F., per Smith & Elder; Griffiths, W. T., Merthyr; Jew, W., Constantinople; Lindley, Mrs., Hyde; Nicholson, W., jun., Sunderland; Sparrow, Rev. W. C., Ludlow; Sutton, E. G. G., Tring; Swan, E., Dorset-terrace; Tallant, W., "Morning Advertiser;" Thomas, J. Merthyr; Walwin, J., Cheltenham.

Entitled to select a Work of Art of the value of 15*l.*—Barrett, H. P., Hobart-town; Bolton, R. B., Saffron Walden; Greatbach, W., Adderley-green; Hawker, W. C., Islington; Hill, Mrs. M., Stanhope-terrace; Jarratt, J. E. H., Cold-harbour-lane; Jennings, A., Fenchurch-street; Nicholson, H., Horncastle; Nottidge, C., Paragon, Streatham; Phillips, T., Regent-circus; Pidgeon, C., Reading; Rowbottam, J., G.N.R.; Sanders, Jas., Bromsgrove; Street, J., Christ Church; Stocker, Miss, Bath; Townsend, J., 6, Upper Belgrave-place; West, W., Redruth, South Australia; White, A. B., Geelong; Wrightson, W., Skipton; Wilson, A., Dundee.

Entitled each to select a Work of Art of the value of 10*l.*—Alcock, S., jun., Sunderland; Arrathune, H., Bangalore; Baker, E., Broomhill; Barnes, T. J., Beckenham; Bayliss, R., Croydon; Boothby, C. E., Burton-on-Trent; Drewett, W., Borough; Edmonds, G. H., Fitzroy-road; Faulconer, Robert, Belsize Park; Hall, R., South Adelaide; Handley, J., Great Northern Railway; Ingram, W. J., Manchester; Jenner, Capt., Cardiff; Lingard, R. B. M., Manchester; Matthew, James, 20, Mornington-crescent; Oakden, R., Goudhurst; Prosser, H., South Australia; Raper, G. W., 92, London-wall; Ravenhill, J. R., Snaresbrook; Ricketts, Mrs. F., Shopland; Sharpe, J., Maidstone; Thomas, J., South Australia.

Entitled each to a Copy in bronze of the "Nelson" Column.—Baker, Miss, Mark-lane; Barber, G., Hardwick; Bosisto, G. N., St. Columb; Bugbird, F., Enfield; Caunter, H., Liskeard; Clarke, C., Sawbridgeworth; Cockburn, W., Kensington; Collings, J. J., Norbiton; Cooper, Major, Dunstable; Demper, A., Mildmay-park; Evill, H., Streatham; Farries, J., Temple; Field, W., Bradford; Goodall, J. C., Camden-road; Hibbert, W., Sheffield; Hinds, G., Goudhurst; Hodge, G., Kentish-town; Lloyd, T., Addiscombe; Nichols, W., Holbeck; Phillips, G., jun., Uxbridge; Sollitt, G., Strood; Spencer, Captain, East Smithfield; Webb, T. E., Ayesford; Wilson, J., Kennington-park; Wood, Mrs., Newport.

Entitled each to a Bronze Medallion Inkstand.—Bass, Mrs., Burton; Booth, W., Manchester; Binnington, Mrs., Driffield; Calvert, T., Islington; Crocker, W. H., Bideford; De Smidt, Cape Town; Espent, W. B., Jamaica; Jackson, Rev. S., Cambridge: Jones, H., Dowlais; Jones, W. J. M., Montreal; Mackenzie, A., Elgin; Mackechnie, A., Sydney; Masters, M., New Kent-road; Penny, J. S., St. John's-wood; Robertson, W., Hackney; Smith, C. D., Glasgow; Thompson, H., Trump-street; Ward, W., Cushion-court; Weller, —, Hackney-road; Woods, J. Newmarket.

Entitled each to a parian statuette, "A Woodnymph."—Adams, F. B., Croydon; Andrews, T. G., Bradford; Arbuthnott, Captain, Bangalore; Bagster, W. H., 29, Lupus-street, S.W.; Baker, C., Melbourne; Ball, J., Rugeley; Barnett, J., Woolwich; Bastin, H., 10, Lovel-road, Leeds; Beer, Mrs., Southampton; Benson, Sir J. Montenotte, Cork; Blackman, B., Greenwich; Booth, E., Barnsley; Bowen, H., Cardiff; Boudry, G., Twickenham; Bowring, E. A., Westbourne-terrace; Brockwell, Dr., Whitehaven; Brown, Miss, Cirencester; Bloomer, B., jun., Pelsall, near Walsall; Caven, J., Alexandria; Cathrow, J., Margate; Chantry, Lady, 42, Brook-street; Cox, J., Old Kent-road; Coxhead, J., 47, Russell-square; Cruickshank, W. J., Yokohama; Cussen, R., North Adelaide; Datson, W., Moonta Mines, South Australia; Davies, D., Adelaide, South Australia; Day, W., Canterbury, New Zealand; De Veber, B., St. John, North Britain; Dolfin, J. P., Walsingham; Downes, G., 1, Huggin-lane; Drew, Mrs., Blackheath; Drewe, G. A., Abingdon; Eiger, E. H., 2, Castle-street, Houndsditch; Fane, W. D., Southwell, Nottinghamshire; Fellows, W. H., 1st Life Guards; Fenn, E, 17, Devonshire-place; Ferguson, W., Holloway; Ferguson, H., York-town; Forsyth, A., Halifax, Nova Scotia; Fydwell, F., Brighton; Furness, C., Cadina; Glynne, Rev. H., Chester; Gray, —, Bow; Green, G., Geelong; Gresham, G., 187, Kentish-town-road; Hallett, F., Commercial-road; Hannaford, B., Bristol; Hards, G., Chelsea; Hassell, J., Northwich; Hayter, G. W., De Beauvoir-square; Haywood, J. M., Canterbury; Heaton, Dr., Leak; Hedges, C., Newnham; Hindley, F., 134, Oxford-street; Hinds, G., Goudhurst; Home, W., Quebec; Ingleton, H., The Mount, Ventnor; King, C., 19, Westbourne-grove; King, W. H., Hackney; Kirk, Dr. Hedon, Hull; Lane, J., Moonta, South Australia; Layard, Capt., Windsor; Lewis, E., Wanganui; Loveridge, Capt., Tettenhall; McGregor, G., Wanganui; Mason, S., Kingston, S.W.; Meredith, C., Merthyr; Mitchell, A., Ballarat; Moore, J., Greenwich; Moody, C., Karinga; Morris, T., Robe, South Australia; Morris, Mrs., 7, Queen Anne-street; Murrell, J., Port Elizabeth; Oliver, Mrs., Twickenham; Prichard, Dr., Northampton; Prophet, D., Melbourne; Redhurst, —, Mount Pleasant, South Australia; Rees, T., Carmarthen; Ritchie, C., Leytonstone; Restorn, G., Glasgow; Robertson, J., Edinburgh; Robertson, J., Constantinople; Sealy, H., 20, Stanhope-street; Secretan, W. C., 7, Royal Exchange; Shand, A., Liverpool; Sheard, Mrs., Highgate-road; Smith, Rev. —, Aberdeen; Stone, J., Port Adelaide; Taylor, J., Stoke Newington; Turnbull, A., jun., Portland Bay; Tatham, L. M., 16, Priory-road, Kilburn; Vincent, Col. H. T., Bath; Ward, J., jun., Clapham; Warren, J., Royston; Webb, W., Belfast, Victoria; Webster, C., Kendall; Wilson, Capt., 10, Henrietta-street; Woodham, Capt., Wandsworth; Zomes, care of Wallis, Cotton, & Co., Simla.

THE ARCHITECTURAL EXHIBITION.

THE private view of this Society's annual collection (the 18th), was held on Wednesday last, in the Conduit-street Galleries. The exertions of the officials, assisted by some fortuitous circumstances, have combined to make this exhibition a good one. We trust, therefore, that the public and profession will show their appreciation of these exertions in catering for their benefit and pleasure. Many reasons might be advanced for its extra goodness. In the first place the presence in the collection of the principal drawings connected with the unseemly Barry-Pugin controversy, whilst that war of words is still raging, will draw many, both of architects and others, to examine the sketches, and form their own opinions upon the subject. Quite apart from their connexion with the dispute in question, the drawings are themselves

well worth careful study, as they show the different stages through which the design passed before the final drawings were commenced.

Secondly, the designs submitted for the ultimate competition for the New Town-hall, Manchester, are, most of them, on the walls; amongst them the successful design of Mr. Waterhouse. Those of the profession who were not so fortunate as to see the complete collection in the Rooms of the Corporation in Manchester, will be glad of this opportunity of observing the principal compositions. In addition to some of those submitted in the first competition for the same Town-hall, there are also many beautiful drawings by eminent French architects, which were to be seen at the late Paris Exhibition, and were highly spoken of at the time. They have been kindly lent for the present occasion. These drawings were brought over from Paris at the cost of the Society, and have to be returned to their owners, free of expense.

A new phase in the existence of this Society is, that instead of being short of material wherewith [to fill all the wall-space at its command, they now exhibit about 100 designs more than on any other former occasion, while many have been rejected for want of hanging-room.

Valuing highly as we do drawings as proofs of artistic power, we yet heartily welcome the presence of numerous photographs showing portions of buildings, as they represent more faithfully than any drawing can the result of the architect's labour, and the manner in which the workman has succeeded in carrying out his intention. Photographs of this sort are also invaluable as representing the status of our art-workmen,—a class whose interest has ever been the care of the *Builder*.

We again call upon the profession to make, without delay, such return for the disinterestedness and energy of this Society as lies in their power. Let them enrol themselves as contributors, and for the future be more careful in supplying them with the best subjects at their command. Were these annual exhibitions discontinued for a few years, architects would find how much they suffered by the suspension of the Society's efforts, and be glad to have a renewal of their good offices at any price. It is, in short, the great arena in which the architect may try his strength with brother athletes, and he has the satisfaction of knowing that his place in the struggle will be assigned to him by judges. The drawings and photographs now on view in this Exhibition number about 700 or 800 separate subjects in some 450 frames. The series commences in the large room near the entrance, and after passing round the apartment is continued in the first or smaller room, and from thence to the screens. We will now approach the drawings, and examine them in consecutive order, referring, however, only to such as we consider deserving of special notice, either for their virtues or faults. Mr. John Croft exhibits some clever interior views of different parts of Westminster Abbey. The detail and perspective are well attended to, and the colouring (with the exception of his peculiar weakness for grass-green tint on some portions of the building) is pleasing and harmonious. Mr. Edward I'Anson contributes six views of different buildings in Russia and parts of Germany; amongst them are a tower from Dantzic, with bulbous-headed cupola in two stages; the St. Isaac Cathedral, St. Petersburg, showing the central and clustering domes; a tower in the wall of the Kremlin, Moscow; the town-hall, Breslau, and others. The sketches are outlined in ink, and slightly tinted. Many drawings, by Mr. B. J. Talbert, are to be found on the walls; one of them is No. 9, called "A Study from the Roof of St. Mary's Hall, Coventry." It is a water-colour drawing, and includes the church spires and their surroundings.

No. 6. "View of the Church of St. Jacques, Antwerp," and No. 12, "View in the Church of Notre Dame, Lambader, Brittany," both by Mr. E. S. Cole, are well worthy of examination. In the first, the view is taken from the south aisle of the nave, showing the junction of the chancel and south aisle with the choir and south transept. The whole length of the south aisle to chancel is given, with a portion of the clear-story and groining to chancel, the part under that being occupied by the Renaissance chancel screen, with its side altar, at which Mass is being celebrated. The picture is finished on the left-hand side by one of the circular pillars of the nave arcade.

No. 5. "Interior view of S. Andrew's Church, Ochsenfurth, Bavaria; and No. 10, "Sketch of Ancient Synagogue" at Worms, by Mr. H. W. Brewer, an engraving from which we have published, are for sale. The detail and architectural character are well preserved. No. 5 shows an apsidal end, with four lofty and narrow two-light windows; then flamboyant traceried heads, finishing close up under the groining of the chancel roof, which springs from carved corbels. The side wall space is very bare for want of shafts or imposts. The chancel arch is of *low pitch*, and composed of nothing more than the continuation of the shallow pilaster of its joints, the whole having a very weak effect. The altarpiece is very lofty, and of the local phase of Renaissance. It is in three stages, and contains in the lowest compartments carvings in high relief, richly gilt, of the three crosses on Calvary, with figures of SS. Mary and John, in niches on either side. In the second state is the "Resurrection;" and in the uppermost the "Coronation of the Blessed Virgin."

No. 14. "Exterior view of Manchester Cathedral," by R. H. Bentham, from the south-east. Until within the last twenty years this building was the old parish church, and is now one of the smallest cathedrals in England. The roof over the nave is coloured, with carved angels on the hammer beams, and with richly carved choir stalls, good examples of the period. The drawing shows the late restorations, and the new tower erected by Mr. Holden.

No. 16. A window and part of a bay from the ruined Abbey at Kirkham, near York, by J. H. Leonard. The beauty of the rich mouldings, shafts, and caps of this graceful lancet-window are very well shown, and the colour of the stonework is pleasing and true. Nos. 18, 20, and 21 contain eight coloured sketches by the Rev. J. L. Petit, taken from buildings on the Continent, with the one exception of that at Peel, in the Isle of Man. Mr. Petit has a true eye for colour, and had he chosen art as his profession, would have achieved a good position amongst the fraternity.

No. 24, "View of the Great Temple of Edfon," and No. 35, "Capitals, drawn to a large scale, from the temple of Esneh," both in Egypt, are by Mr. R. Phené Spiers, who contributes many other valuable drawings to the collection. No. 24 is a very bold and crisp drawing, slightly coloured, but well conveying the effect of solemn grandeur invariably connected with the best work of the Egyptians. No. 35 is very carefully drawn and delicately coloured, and is altogether a valuable drawing. No. 28, "Laborare est Orare," by F. P. Cockerell. A masterly composition delicately treated. It is an old friend, and having been alluded to in a previous number of this journal, we will pass on to No. 33, "Hotel de Ville and Church, Berque, near Dunkirk," by Ernest George; a valuable study, showing two very fine towers. Both the sketching and colouring are spirited. No. 39. "Competition Design for Church at Hemel Hempsted. Interior View," by Mr. Henry Hall, marked "*Palmam qui meruit ferat*," rather a dangerous motto, we think, to attach to this composition.

No. 40. With the exception of the perspective of some of the arches, this is a very careful and refined coloured drawing of the Interior (looking east) of S. Charles Borromeo, Ogle-street, Marylebone, by Messrs. Wilson & Nicholl. The roof over the nave looks very bare, which rather damages the look of the drawing.

No. 46. A pen and ink drawing of the Interior, looking east, of the Church of St. John, Torquay, Devon, now in course of erection, by Mr. G. E. Street, A.R.A. It is rather scratchy and confused in parts; but the general correctness of the perspective and accuracy of detail, in conjunction with the architectural merits of the composition, render it a very valuable addition to the exhibition. The chancel is shown to be square on plan, having in the east gable a fine window of five lights, with an octagonally-treated wheel-light over the same. The roof is groined in three bays, and lighted by a clear-story reaching to the crown of the groining. On the south side are two arches, supported on clustered columns, and occupied by a metal screen, giving access to a south aisle. Three steps and a gate in the chancel-wall lead into the nave. On the north of this wall, and at the junction of the nave and chancel piers, is a circular stone pulpit, having a small arcade with circles over running round the whole.

We shall continue our notice next week.

ON BUILDINGS FOR EUROPEAN OCCUPATION IN TROPICAL CLIMATES, ESPECIALLY INDIA.*

THERE exists nothing of a physical nature which causes such an entire revolution in our feelings and habits, in ourselves and in our surroundings, as the addition or withdrawal of a few degrees of heat. Even within the limits of our own temperate climate, we know no contrast so strong as that between a sweltering harvest heat, and the cold of a keen black frost,—the sunny life of a brilliant summer day, and the bound-up torpor of a deep winter snow-storm; and when we carry our inquiries to the climates which lie at the extreme limits of human endurance, either of heat or cold, we find almost every condition of life reversed. The food, the dress, the dwellings, and the habits of the Esquimaux have hardly a single thing in common with those of the Hindoo, and both differ widely from our own.

Many of the countries where the heat of the sun is far greater than in England, and especially the East Indies, are so connected with us by commerce or colonization that, from time to time, English architects are called on to design buildings to be erected within their limits. Not fewer than eight Fellows of this Institute and four or five other architects practising here have been, within my own knowledge, lately called on to prepare designs for proposed buildings in Bombay. Two others, Messrs. Owen Jones and Digby Wyatt, have, within the same time, been called on to act as advisers respecting a large proposed building for the same city, the plans of which I had to prepare; and they, in that capacity, rendered me cordial and most invaluable assistance, which I am happy to seize this opportunity of publicly acknowledging. Some five or six English architects also are, or lately were, residing and practising in that one city,—facts which show that buildings for such countries as India may be fairly considered as not too remote from our own possible practice to be treated here. If, then, the conditions of life in a tropical climate are very far removed from those with which we are here conversant, it cannot but be that many differences will exist between the buildings with which we are familiar as suiting our climate and such buildings as will suit the tropics; and it will be our business to-night to consider a few of these differences. First we shall take note of some of the essential requirements for European life in a tropical climate, such as that of India; afterwards we shall consider a few of the peculiarities which will affect the actual erection of the buildings, and the most obvious of the difficulties to be apprehended. Throughout I must be understood as referring to buildings for the use and occupation of Europeans only: my time is too short, and my information on the point too imperfect and fragmentary, for me to say anything on the interesting though less important subject of such buildings as are occasionally put up in tropical countries for the use of natives. In each of the two heads of this inquiry we shall be naturally led, as we go on, to notice such expedients and methods as may be best employed, or as have been actually found efficacious in meeting the needs which we shall discover. My own justification for bringing forward this subject is, that I have been obliged to make myself acquainted with the requirements and circumstances of, at least, one tropical climate, that of Bombay. The Government of Bombay proposed, in 1864, to erect the European Hospital in that city, from designs which I had submitted in competition. This led to my visiting Bombay at the end of that year, and to my being associated with Mr. Trubshawe, the consulting architect to the Bombay Government, in the preparation of working drawings for several public and other buildings of importance; I can, therefore, offer you the results of some little practical experience; and I hold it as almost a bounden duty of any member of this body, whose practice has led him to acquire information not readily accessible, and likely to prove of some use, that he should come forward here, and contribute it to the common stock.

It may provoke a smile to say that the great peculiarity of a tropical climate is, that it is very hot there; but, nevertheless, that *is* the great peculiarity, and the one point an architect must never forget, remembering that even what is called the cold season is far hotter than our

* By Mr. T. Roger Smith. Read at the ordinary general meeting of the Royal Institute of British Architects, held on the 27th of April, Mr. W. Tite, M.P., president, in the chair.

summer. It is also very light in such a climate; at some period of the year it is further very wet, the rain falling at times in torrents, and the air being saturated with moisture; but in the fine season it is ordinarily uninterruptedly fine, remaining so for long stretches of time. Climatic disturbances, however, when they come, are violent; wind-storms, dust-storms, thunder-storms, with driving rains — perhaps earthquakes—must be expected occasionally; and such disturbances are more sudden in their visits, and more violent in their force, than in our climate.

Insect and reptile life are far more prominent within the tropics than here. Household pests there include such formidable enemies as the cobra, the scorpion, and the white ant. The white ant is an enemy of the most destructive powers. It eats almost all kinds of woods, and if the timber with which a house is built be such as it will devour, it will be not unlikely that all the woodwork of the house will be hollowed out and eaten away. The essential oils of one or two woods, such as teak and blackwood, seem to protect against them, but all ordinary wood is liable to be eaten by this ant. The damp of the monsoon time is a second powerful destructive agent; any unpainted or ungalvanized surface of iron would be found oxidized to a remarkable extent; and whether it be this, or the saline particles of the air, or an extra dose of actinic power in the sunlight, I know not, but the climate of Bombay, though free from frost, appears to act almost as destructively on building-stone as that of London.

The people, again, who will be about you in the tropics, are essentially different from Europeans. They will be all, or nearly all, natives; and if in India, all of various *castes*. The number of servants will be very great; they will dispense with most things that an European wants, but, on the other hand, they will require some things which in Europe would not be thought of. No English gentleman, for example, would think of planting all round his private house, a sort of hamlet of little cabins for the wives and children of his servants, any more than he would dream of his valet being willing, under any emergency, to sleep on a mat outside his bedroom door, as a personal retainer might have done here in feudal times. In India both would seem very reasonable things. The people engaged on the work will also differ altogether in their notions of workmanship, and especially of accuracy and finish, from the European artizans for whom we are accustomed to make drawings. Their setting out will be defective, and their finish, to an European eye, faulty; but, on the other hand, if the right sort of men be found out, and employed in the right way, their ornamental work, obtainable in India even now, after long disuse has caused the higher branches of the art of building to languish, will be very beautiful, and much of the workmanship excellent. The joinery and cabinet-work especially, executed with very rough tools, and put together without glue, will surpass most English work for solidity and durability.

To return, however, to the heat and light. Where the sun's heat is so powerful that nothing but English pluck prevents the attempt to work being altogether given up, and between sunrise and sunset it is almost impossible for an European to expose himself safely to his rays—where walking a few hundred yards, at midday, even under an umbrella, would be an exhausting and imprudent exertion for an European—where fresh air is the greatest essential of comfort, almost of life—where the glare of light is so intense, that the smallest unshaded opening seems, in the hours of sunshine, to admit more brightness than is compatible with comfort—and where the main walls require to be screened, both from the pelting heat of the sun in the fine season, and the driving rains of the wet season, it is almost self-evident that rooms should be large and airy, windows and doors so open as to admit every breeze that blows, yet so shaded as to keep out as much of the light as possible; and that walls should be far thicker than here, is necessary, and sheltered by some outer screen.

Outside all the external walls, or, at any rate, on all sides open to the sun's rays, a screen called a verandah is essential; and it becomes, in fact, the leading feature of buildings for the tropics. This may be best described as something like an external cloister, ordinarily about 10 ft. wide, the roof usually running over it in a continuous line, and overhanging it. The verandah is, of course, often constructed of slighter materials than the main wall, but, where practicable, it is better to be of masonry. It is, of course, desirable to have it as many stories in height as the building, and covering most or all of the wall, but it admits of many variations, corbellings, projections, breaks, &c. The floors of the verandah should be water-tight, and should slope away from the building. Towards the quarter of the wet winds, it will be well to provide means of partly or entirely closing the openings; this is usually effected by temporary matting, and some permanent contrivance for the purpose is rather a desideratum. In the day time the floor of the verandahs, as indeed that of the rooms, is often sprinkled with water for coolness. These roomy appendages are not all lost space, advantage is taken of them when in shade, or catching the passing breeze, and then they serve as workrooms for native workpeople, or for lounging, smoking, walking, and even dining and sleeping in; Indian life, being much *al fresco*, and privacy little studied, compared with comfort. The verandah, with its unglazed openings, its deep shadow behind them, and its overhanging roof, affords the chief, and a remarkably fine opportunity, for external architectural treatment in any building for the tropics. In some of the more artistic native houses, it is beautifully treated in carved wood. As an example of the treatment of it in masonry, I may refer to the Mahommedan buildings at Ahmedabad, shown in Mr. Hope's photographs, or to the fine design of Mr. Burges, for the Bombay School of Art, which exemplifies excellently this as well as many other points of the proper treatment for a building for the tropics. Allied to the verandah are corbelled balconies, and open oriels thrown out to catch the breeze and afford a cool evening nook; such features occur in the best Mahommedan work, and afford an excellent opportunity for picturesque treatment.

Behind the shelter of the verandah, the doors and windows should be spacious. The building should, if possible, be made to point so as to catch the prevalent breeze; for in the tropics winds often blow with a wonderful regularity from the same quarter for months together. And the building should, if possible, be so arranged, with rooms *en suite* from side to side, and having openings opposite to openings, that the wind may blow quite through it, windows opening down to the floor, and doors placed opposite the windows, and both made wide and high. The necessity for a thorough draught, and the use as a thoroughfare all round the building of the verandah, have combined to exclude corridors almost entirely from dwelling-houses; and your life in an Indian bungalow (or house) is public to a degree that would here seem strange, and would, in fact, be unsuitable to a temperate climate.

The general plan of all buildings for the tropics ought to be, as will have been already understood, very simple, and at once compact and roomy. All servants reside apart, and few stores are kept in any house; consequently, buildings intended for residence are relieved from almost all that gives rise to great complication in Europe. The external verandah will be found to swell the bulk of the building extraordinarily, but then it is constantly used for every sort of purpose to which room space might have been appropriated; and it is also so capable of furnishing here and there an odd corner to be cut off for odd purposes, that it enables the architect to reduce greatly the number of parts into which the block of his building is divided, and so to render the form as simple as possible.

Over this simple mass a simple roof should be thrown. If not a terrace, its pitch should be flat and its eaves overhanging, so as to give most shadow, and throw the heavy tropical rains well off the foot of the walls. In many, perhaps in most hot countries, however, flat roofs are the rule, their comfort during the hot part of the year being felt to overbalance their inferiority in the rainy season. The dome also forms a leading feature of many Oriental styles of building.

In one or two good Mahommedan domestic buildings which I visited, I found the stories but low. This, however, would not at all satisfy any European residents, or I think be suitable to our great need, in a sultry climate, of all the air we can get. The ordinary height of a story is about 18 ft. or 20 ft.; and stairs being a serious fatigue in a hot climate, buildings of many stories are not common. An underground basement is not usual; it would become a harbour for vermin and filth, and would be flooded or damp in the monsoon (or wet) season. The ground-floor is usually not less than from 2 ft. to 3 ft. above the level of the surrounding earth, and raised on a solid terrace. This height is, I believe, chiefly given as a protection against moisture, and hollow floors are avoided because vermin and snakes would be sure to get into them. Many residences, where ground is plentiful, are only one story in height, and few buildings could conveniently have more than three stories. I may here suggest that the frequent use in hot climates of timber-built houses, of only one story high, may be in part accounted for by their being safer than any other in times of earthquake. This can hardly, however, be the reason of their use in Bombay. Between the ceiling of the top story and the roof there should be a space well ventilated and unoccupied, to keep the top story cool, a precaution often neglected.

It may be almost unnecessary to remark that no fireplaces or chimneys are ordinarily required, and that kitchens ought to be, where practicable, an outbuilding apart.

Coming now to the openings for doors and windows, they will rarely require to be filled, inside the building or out, with a solid door or shutter. The ordinary window is a large casement hung folding, and each fold in two flaps; the flaps are divided into several heights, and filled with louvres, like those of a Venetian blind, only finer, and capable of being set close or open; the ordinary internal door is of the same character. Internal openings are often, however, not even fitted with doors of this sort, but left as arches, to be closed occasionally by the use of silk or open black wood screens, often of beautiful design, reaching only to the springing of the arch, and with a space of a foot in depth left open underneath, to admit a current of air along the floor. This substitution of some sort of pierced work for panels, I may observe, is carried out in many directions. In some of the beautiful Mahommedan buildings the panels of pierced brass-work and pierced stone which occur in the openings form the most beautiful decorative feature conceivable. These have been elaborated in such a case as the window in the mosque of Seedee Seyeed, at Ahmedabad, to a point which challenges comparison with our most complete tracery. Other modes of filling openings may be used; for example, in Cairo and many other Eastern cities the most effective grilles for filling windows are formed of small turned wooden spokes, fitted together in a simple effective way. In the Egyptian Okel, in the park of the Paris Exhibition, this was well shown, as were other peculiarities of structures suited for hot climates. It occurs, sometimes, in most or all tropical climates, that from external openings it is necessary to keep out the wet, and sometimes even the heat. I believe even, that in some very hot inland regions, away from sea breezes, the air is so hot during the sunshining hours that it is customary to keep it out instead of letting it in. Here, of course, external openings are made capable of being thoroughly closed, and comparatively small. It also is necessary in some districts to be able to shut out night fogs, or sea fogs, or some other injurious state of the air, and even cold winds; and in Bombay, which is on the sea-shore, I found that it was necessary to be provided with the means of closing external openings against the humidity of the monsoon or wet season, and even against driving dust; accordingly there all window-frames have two sets of folding casements, one with the Venetian louvres already described, the other glazed, and kept folded back out of the way, except in the wet season. I am not aware that our sash-windows have ever been attempted to be employed, and they are just such a contrivance as I should expect would be ill carried out by native workmen. Casements in solid frames are preferable, and those frames that I have seen, internal doors as well as windows, are always framed with a cill, which in doorways you have to step over.

It is not, I think, usually requisite to make provision for strongly protecting any building for European occupation against robbery. It is usual to have watchmen patrolling round even private houses all the night, and more reliance is placed on them for protection than on fastenings or doors. Notwithstanding the general simplicity upon which I have insisted, one or two points, in the arrangement of buildings where Europeans are to reside, in India, at least, often cause some perplexity to the architect; but these it is imperative he should attend to. For instance, the bedroom of any European entitled to the smallest comfort must have appended to it a bath-room, in which stands, on a

large cement platform with a raised ledge, a large sponging bath: this has to be daily filled by a water-bearer: often it is so placed as to be filled through a pipe, without his actually entering the room; but however this may be, the arrangement is not that water is laid on as in England, but that it is brought daily in a skin on a man's shoulder to the outside, if not the inside of the room. For this purpose, consequently, access must be reserved for the bheestie (or water-carrier). But this is not all. In or adjoining each dressing-room is a convenience taking the place of a water-closet. The system of water conservancy is not established, and may probably never be found available in India; while even the more suitable system of Mr. Moule and his earth-closets would not obviate the necessity of removing, more or less frequently, fæcal matter by hand. This is at present done twice daily, and the persons whose business it is to do this work (and who are termed sweepers) must not, both on account of the offensive nature of their work, and on account of their lowness of caste, come into the building so as to risk their contact with higher caste servants. Hence it becomes necessary to provide a sweeper's staircase, and often several such (which are very frequently external staircases, more or less open), with means of access along verandahs or otherwise to the external wall of each dressing-room, and to form at each convenience a small doorway through the wall. In a complicated building this necessity for a dressing-room to each bed-room, and for a secluded and external access to each dressing-room for the water-carrier and the sweeper, makes no inconsiderable demand on the ingenuity of the architect, and even on the space at his command. I may add that as regards bath water a regular system of drain-pipes to carry it off does not seem usual. Provision is made for discharging it by some simple outlet to the exterior of the building, where it flows over the surface of the ground, and soon sinks in, or is evaporated by the sun's heat. Here it may be fitting to add, by-the-bye, that eaves-gutters and down-pipes, and means of storing rainwater, do not seem to be in use.

Another peculiarity of tropical life is that, as every European who can afford it must ride to his business, and about his business or his pleasure, every building requires a carriage porch, sheltered from the wet of the monsoon and the heat of the other seasons. Every house and most public buildings will also require stabling and coach-houses. These are very much ruder than our own, but must be spacious.

Special attention must be paid to the great value of one aspect as compared with another—the breezy and the shady sides of a building are preferable to the other aspects in a very great degree, but the difficulty of securing a good aspect for as many rooms as possible in a building being not unknown in England, I will not enlarge upon it.

Wherever practicable, an Indian building is placed within an ample walled enclosure, called a compound, which is a kind of compromise between a meadow, an orchard, and a garden; and in this compound, when a number of attendants are required, nestles a cluster of huts where they and their families live, and other huts, such as the cook-house, where the household work is mainly done. In city buildings it is usual to give up the whole or some part of the ground floor to the servants, though in some buildings lately erected in the city of Bombay they, and the kitchen (called cook-room), have been provided for in the topmost story. The number of attendants required is very great. As a rule in all tropical countries native labour is cheap and plentiful; each individual does not do much, and the subdivision of labour is carried out to a perplexing extent. It is worth taking a good deal of trouble to arrange the stables and these servants' dwellings, so that they shall not come to the windward of the building they belong to,—that is, if the prevalent direction of the wind is known. Various bad odours are likely to arise there, and even the fuel burned in cooking in these places, being cakes of dried cow-dung, gives forth an unpleasant smell, and this or any other bad smell is peculiarly offensive in a hot climate.

Having now said something upon the arrangements and features desirable in a building intended for a tropical climate, we are next to consider some other peculiarities which may have to be provided for in preparing to execute such a building. The difficulties attendant upon the actual carrying out of any building in a tropical country are often serious. They are of two classes; those of a structural nature,—as difficulties relative to materials, to labour, to modes of working, &c., and those of what may be termed an administrative nature, that is to say, those affected by the peculiarity, or arrangements, or want of arrangements, for getting building work done. It is not sufficient to prepare plans for a building which would be a good-looking and suitable one if it were built. It is also necessary that the plans and arrangements should be fitted as nearly as possible to the material and moral circumstances of the case. This necessity is too often overlooked, ignored, or at best inadequately met; and in consequence works well designed in this country have often been ill carried out, abandoned, or modified in a destructive sense abroad. There may be many things that would prove good if done, which yet cannot be done, and others which could be done, but which people cannot be got to do.*

* To be continued.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.†

Norwood.—At Norwood the results of irrigation have proved equally remunerative, the land being, as has already been stated, on a clay formation distinct from that of Croydon. The arrangements for the purification of the water are most elaborate. By gravitation the sewage is conducted from the outfall, through a covered straining tank, whence the solid refuse is pumped by hand, with moveable apparatus. The covering of this tank is questionable policy. It simply effects the concentration of the sulphuretted hydrogen, which if exposed to the atmosphere, could do little offence, and renders the cleansing a duty of tenfold danger. From this point, the sewage is passed in conduits, covered and open, and flows through the soil three several times ere it is finally discharged. The natural conformation of the ground is admirably adapted for this, and the purification is perfect. The quantity irrigated is about 37 acres. Prior to the application of sewage to the land at South Norwood, it was considered a very poor soil indeed; but recently the present tenant, Mr. Cousins, has offered 16*l.* per acre per annum for a twelve years' lease.‡

Edinburgh.—It is recorded by various authorities that town sewage has been here applied to the same land for a period of at least 200 years. The value of this fact is great, for in it we find a decisive proof that the land is not exhausted by this method of cultivation, even after the lapse of generations, but that exceeding fertility continues to be its characteristic. The soil upon which the utilization is mainly effected cannot be said to have ever been abundant of the elements of fertility, being simply the pure sea-sand. An additional valuable fact is, that throughout this long period of cultivation, conducted in a very rude and imperfect manner, there exists no record of injury to the health of the vicinity having been sustained therefrom. These considerations, taken in conjunction with the enormous rents that have long been paid for the irrigated land, give Edinburgh a prominent position as an exponent of the vast manurial wealth which lies hid in the form of common town sewage. The late Mr. Smith, of Deanstone, in reporting upon the application of sewage to the purposes of agriculture, gives the following description of the irrigation works at Edinburgh:—"The sewer-water, coming from a section of the Old Town, is discharged into a natural channel or brook at the base of the sloping site of the town, at sufficient height above a large tract of ground to admit of its being flowed by gravitation over a surface of several hundred acres. The water as it comes from the sewers is received into ponds, where it is allowed to settle and deposit the gross and less buoyant matter which is carried along by the water, whilst it flows on a steep descent. From these tanks or settling ponds the sewer-water flows off at the surface at the opposite end to its entrance. The water so flowing off still holds in suspension a large quantity of light flocculent matter, together with the more minute *débris* of the various matters falling into the sewers, chiefly of vegetable or animal origin. The water is made to flow over plots or plateaux of ground, formed of even surface, so that the water shall flow as equally as possible over the whole, with various declinations, according to circumstances; and it is found in practice, that the flow of the water can easily be adjusted to suit the declination." The report goes on to say: "The practical result of this application of sewer-water is, that land which let formerly at from 40*s.* to 6*l.* per Scotch acre is now actually let at from 30*l.* to 40*l.*; and that poor sandy land upon the sea-shore, which might be worth 2*s.* 6*d.* per acre, lets at an annual rent of from 15*l.* to 20*l.*;" a veritable mine of wealth. This land produces from four to five crops of Italian rye-grass per annum: and as much as eighty tons per Scotch acre have been taken off in a single year. Yet so little alive are the rate-payers of Edinburgh to their own interests, that, glad to be rid of this valuable commodity, they make a free gift of it to their farmers, or rather to their landlords; who, on their part, find no better occupation than in turning its rich fertilising ingredients into gold. The consequence of this disregard of public interest, so little creditable to the practical genius with which the Scotch are supposed to be gifted, is, that instead of being applied in a careful judicious manner, so as to make the most of it, the sewage is allowed to flood the land with wasteful prodigality, by reason of which a very considerable portion of it escapes without effecting the slightest good. It may be a necessary policy, during the infancy of irrigation experiments, to grant concessions of sewage at a nominal or pepper-corn rent; but after men have grown grey in the experience of its value, it is simply neglect to suffer a few private individuals to reap the advantage which should accrue to those whose sole property it is, to wit, the rate-payers.

Rugby.—The works at Rugby, like those at Croydon in their earlier stages, may be said to have been of excellent service in demonstrating what is to be avoided in sewage irrigation; and we cannot do better, in viewing this side of the question, than attentively study both these examples, and profit by their errors. In 1856, Mr. G. H. Walker took a lease of the sewage of Rugby, at an annual rent of 50*l.*, with the twofold object of preserving the River Avon from pollution, and at the same time fertilising his own land. He constructed a tank capable of holding 150,000 gallons, and erected a steam-engine of 12-horse power. He then laid down six miles of iron pipes, in five radiating main branches, with subsidiary branches. Through these pipes the sewage was pumped from the tank into gutta-percha hose affixed to hydrants, and so distributed over the land. The hose and jet system proved a failure, and was exchanged for open carriers, necessitating great additional expense. Other costly mistakes were discovered. The outfall, instead of being so low as to require steam-power to raise the sewage on to the land, might have been so constructed as to have admitted of its flowing over the ground by gravitation only, whereby the cost of engine and pumping apparatus, with their annual working expenses, might have been saved. The six miles of iron piping, of far too large a section for their original purpose, as well as of too great a lineal extent, were, on the adoption of open carriers, rendered useless, being abandoned by the lessee.* The land upon which the sewage was applied, instead of undergoing a special preparation for a special crop, was old farrowed pasture of the ordinary kind, covered with a strong stubborn turf, entirely unsuited for treatment by irrigation. The system of application was also injudicious, and it is not surprising, after so disastrous a catalogue of errors, Rugby should stand forth as a signal exception to the usual success of the utilization of sewage by irrigation. Yet, although the Rugby experiment has proved a failure so far as the enterprise of the lessee is concerned, it has by no means affected the estimation of sewage manure. Mr. Walker has stated in evidence that, under proper management, the money return will amply compensate expense, even with the existing arrangements; and he considers the Rugby farm to be more valuable and productive since the application of sewage.† Notwithstanding, then, the untoward circumstances which have attended the works at Rugby, they cannot justly be looked upon as a failure in demonstrating the value of sewage but rather as a proof that mismanagement will bring the most promising enterprise to a disastrous end. Rugby was the scene of Mr. Lawes's experiments.

† See pp. 146, 168, 202, 222, 239, and 290, *ante*.
‡ Leam. Congress Papers, p. 142.

* Rep. Met. Sewage, 1864: 3603 to 3610, 3737.
* Rep. Met. Sewage, 1864: 3739.

Milan.—The drainage of Milan, which receives little or nothing of the solid excrement of the population, is received into two conduits, which make the inner and outer circle of the city, and unite in a natural channel called the Vettabbia, at the southern outskirts. The Vettabbia flows ten miles, and during its course to the Lambro, wherein it falls, distributes the sewage thus diluted over a considerable area of level meadows. The irrigation is carried on by the system of submersion, and is very successful, four crops of grass and three of hay being cut in the year. Professor Way adverted to the sewage of Milan in his report to the Commission,* and stated that although it was so dilute as hardly to be distinguished by the senses from ordinary stream water, yet it conferred upon the land to which it was applied, an increased value of from 4*l.* to 5*l.* per statute acre per annum above that obtained for land irrigated by streams containing no sewage.

The National Advantages of Sewage Irrigation.

It is not within the scope of the present crude statement of facts to enter into anything like a minute consideration of the manifold and widely-extended benefits which may be expected to accrue from the realisation of success in utilising the contents of our sewers. It will, however, be to the purpose to summarize the most prominent of them.

In the first place, it will be the means of effecting a sanitary reform unrivalled in the history of cities; and this may be submitted as the primary object to be attained. It is well if our impure refuse can be converted into gold; but it is better that it should first be rendered harmless to the public health. By this method, then, we not only obtain perfect facility for drainage, but we divert it from those abundant sources of water supply which hitherto it has perennially defiled; so that besides effectually banishing the noisome stenches and putrid epidemics which hover over the shores of befouled rivers, we render these latter once more to the beneficent purposes of nature, and swell the diminishing bulk of our present water supply by immense volumes of the purest and most wholesome water. Secondly, in placing the sewage upon the land, the country will become possessed of a permanent revenue, derived from a solid basis—a welcome relief to a heavily-taxed community. Thirdly, in thus developing the national resources, by multiplying the productive power of extensive districts, and enriching soils at present barren or impoverished, an important law in political economy will be carried out, and that dependence upon foreign supplies done away with, which is an ominous and almost unique feature in the commerce of this country. Lastly, the development of a large field for manual labour tends to a wholesome reduction of the evils of over-population.

The following is a tabulated statement of the value of London sewage per head of the population. The calculations are based upon its estimated worth per ton, taken with the net quantity of sewage discharged, the population roundly numbered at 2,500,000:—

Net weight of sewage. Tons.	Price per ton.	Population.	Value per head.
155,544,000 (Mr. Basalgette) ...	0s. 2d. 0 1½ 0 1	2,500,000 ,, ,,	£0 10 4½ 0 7 9 0 5 2½
215,762,000 (Capt. Galton)	0 2 0 1½ 0 1	,, ,, ,,	0 14 4½ 0 10 9½ 0 7 2½
266,000,000 (Mr. Ellis)	0 2 0 1½ 0 1	,, ,, ,,	0 17 9 0 13 3½ 0 8 10
			9)4 15 7
Average value per head			£0 10 7½

Thus we find that the average estimated value of London sewage per head of the population is about 10s. 7½d.; and if we roughly estimate the whole population of England and Wales at 20,000,000 souls, it will be found that our drainage refuse represents a gross annual value of 10,625,000*l.* sterling. Of this, say that not more than three-fourths can be rendered fully available, and there is still left the sum of 7,968,750*l.*, a fact worthy of the attention of political economists. It may, nevertheless, with truth be alleged that a very considerable portion of the drier and more solid parts of sewage are not at present wasted, being applied to the soil. But the privies and cesspools of our most populous towns, which chiefly contribute to this imperfect utilization, are already under condemnation upon the strongest sanitary grounds, and will sooner or later yield to the substitution of water-closets. It must not be forgotten also that under the existing state of things, immense sums are being annually paid from borough rates for riddance of this valuable commodity. At Manchester 6,600*l.* per annum is paid for the removal of the contents of cesspits,* an expense which more or less is universal throughout the country. At Aldershott it has already been said that 500*l.* or 600*l.* was annually paid for this purpose before the introduction of main-drainage. The population was then six or seven thousand: the cost therefore would amount to nearly 2*l.* per head. It is truly to be hoped that the fact of this extraordinary waste of national wealth will not long have to be recorded against those numerous and powerful corporate bodies in whose hands the administration of sanitary government is centred.

"All our advances in arts and sciences," says Liebig,† "are of no avail in increasing the conditions of human existence; and although a small fraction of society may by their means be gainers in material and intellectual enjoyment, the load of misery weighing upon the great mass of the people remains the same. A hungry man cares not for preaching, and a child that is to learn anything at school must not be sent there with an empty stomach.

"Every step in advance, however, made by agriculture serves to alleviate the sufferings and troubles of mankind, and to make the human mind susceptible and capable of appreciating the good and the beautiful that art and science present to us. Improvements in agriculture constitute the only solid foundation for further progress in all other branches of knowledge."‡

M. P.

* Rep. Met. Sewage, 1864: 4721.

NEW TRENT BRIDGE FOR NOTTINGHAM.

THE town council have resolved to erect a new bridge in place of the old Trent bridge from a design by their surveyor, Mr. Tarbotton, at a cost of 31,000*l.* The site will be a little lower down the river than that of the old bridge. The structural part of the bridge will be allied in its mechanical details to the modern bridges over the Seine and the Thames. The material for the abutments and piers below the lowest water mark as also for the hearting of the same will be of the best brickwork. The exposed surfaces of the abutments and piers will be formed of rock-faced Derbyshire or Yorkshire grit-stone, with the more ornamental parts of red sandstone, magnesian limestone, and granite. The arches will be of cast-iron, as being most suitable to resist the strains pertaining to the condition of the ribs employed. The upper platform to support the roadway will consist of wrought-iron girders supporting wrought-iron buckled plates as used on Westminster and on the largest railway bridges, or similar material. The surface of the roadway will be of Yorkshire landings for the footpaths, bitumenized concrete and macadam for the carriage-road, and cast-iron channels, similar to those used by Mr. Tarbotton in building the Navigation Bridge, for the gutters. The parapets will be of cast-iron, with geometric ornamental open work, containing medallions composed of lilies and other water flowers and leaves, made of cast-iron and conventionally treated. These are intended to be gilded, and the rest of the ironwork painted. The width of the bridge clear of the parapets will be 40 ft., containing footpaths 8 ft. 6 in. wide, and a roadway capable of accommodating three lines of carriages with ease and safety.

IMPROVED DWELLINGS FOR SALFORD.—At a meeting convened by the mayor, it has been resolved that a company be formed under the provisions of the Companies Act, 1862, to be called "The Salford Improved Industrial Dwellings Company, Limited," with a capital of 25,000*l.*, in 1,000 shares of 25*l.* each, and that a subscription list for shares be opened, and so soon as the list amounts to 8,000*l.*, the mayor will convene a meeting of the members for the purpose of electing directors and other officers of the company. Subscriptions amounting to upwards of 6,000*l.* were at once put down.

* "Natural Laws of Husbandry," p. 226.
† Ibid. p. 226.
‡ To be continued.

LUDUS PATRONYMICUS.*

DR. CHARNOCK has made a collection of upwards of 3,000 peculiar surnames, and prefaced them with an etymological scrutiny into the real meaning and derivation of a large number of the most curious of them. The volume containing the result of his examination might well be entitled "The Consolations of Etymology;" but he has preferred to call it "Ludus Patronymicus." Although some of our peculiar surnames are nicknames, most of them are corruptions from euphonious appellations; and the supposition that the owners of names that are disagreeable in their present form would be glad to return to the original or proper orthography, instead of changing them for new ones, has been the main-spring that has directed our author's labours. The familiar instance of the abasement of St. Aubyn into Stubbs is not more startling than scores of similar degradations. Modern usage, with its tendency to abbreviations in all words, has reduced Fenwick to Phœnix, and thence to Spinks; in other words, in the course of generations the Plantagenet Squire Fenwick and his Tudor moss-trooping descendants have lapsed into police-constable Spinks. Some of the De Veres are now Wires and Weirs. The Seymours, or St. Maurs, are Simmers. Some of the Laceys are Lace. The Traceys have contracted to Tress. Sir William de Sevenoake is represented by Snooks. The Tremaynes have degenerated into Trimmings; the d'Aubignies into Twopennys; the Fitz-Paynes into Phippens. "Few," says Dr. Charnock, "would probably change their name from Buggin or Simper to Smith, if they thought they were justified in writing Bacon and St. Pierre. The same might be said of such names as Death, Dearth, and Diaper, from d'Aeth, d'Arth, and d'Ypres respectively." Everybody, we must warn, who owns a peculiar name is not certain of improving it by tracing it to its source. To be stripped into Evans after having been Heavens would scarcely be so satisfactory a return to a starting point as the instances just quoted. But the rule is in favour of the investigation.

The amount of research expended upon the perfection of Dr. Charnock's work may be realised when we scan the list of authorities he has consulted, some seven-and-twenty in number, including the works of the most esteemed German and Danish philologists. Some of his verbal explorations are, indeed, polished pieces of scholarship. We will quote a few of our best-known eccentric names, beginning with Cubitt. This Jamieson gives as a probable abbreviation of Cuthbert; but our author thinks that, with Cupit, Cupett, and Cobbett, it may be a diminutive of Cobb, Copp, Cope, the old German Cobbo, Coppo, Cuppa, whence the patronymics Cobbing, Copping, &c.; "from A. S. *cop*, O. H. G. *kop*, Mod. G. *kopf*, D. *kop*, the head; O. Fr. *cope*, *copeau*, *coppe*, *coupeau*, *cime sommet*, *pêage*. Cob is also a name for the sea-fowl, the sea-cob; and in some parts of England for a spider; from O. D. *kop* or *koppe*, retained in *koppespin*, *spinnekop*, a spider. *Cob* is also a close-built strong kind of pony; and *cob*, *cop*, is still used for the top or head." Telford, formerly written Telfer, is from the Norman name Taillefer, cut iron, in recognition of a feat performed by William, Count of Angouleme, who with one stroke of his sword Durissima, cut in two the body and cuirass of King Storris. In Scotland, in the sixteenth century, it was written Tailzefer. The celebrated engineer, our author thinks, could not have been aware of this origin when he changed his name to Telford. Sheepshanks has been supposed to refer, like Cruikshanks, to mal-formed legs, but our author has given another possible origin. There is a narrow lane in Canterbury, called Sheep-Shank, which he thinks must have referred to some tavern, such as the Sheep or Ship Tavern, from the G. *schenke*, a drinking-house, or ale-house. The surnames Schenk and Schenck signify a publican or vintner: hence Sheepshank may be a combination of the tradesman and his sign. Going on to less remarkable names, we come to further singular deviations. Dollman was perhaps a man from Dol in Bretagne; Farthing was Fardan, in the days "Domesday" was compiled. Pennythorn belongs to the family of names starting from the Welsh *pen*, head, chief, end, which includes Pennycook, Manypenny, Turnpenny, &c.

† "Ludus Patronymicus; or, The Etymology of Curious Surnames." By Richard Stephen Charnock, Ph. Dr., F.S.A., F.R.G.S., &c. London: Trübner & Co., No. 60, Paternoster-row. 1868.

Prout is a corruption of Provost. Smiles is more properly Smellie, from *smeath leag*, smooth pasture. Tite is the French form of Titus; Truefitt, corrupted from Tyrwhitt, has been Tyrrell, and was perhaps the diminutive of *turris*, a tower. Virtue, with less transformation, is from the French town on the Loire, Vertou; Wiggs can look back for consolation to the ancestry of Cerdic, king of the West Saxons, and can write themselves Wiga, as in "Domesday." The still more objectionably named Wildgoose can likewise refer to the genealogy of Anglo-Saxon kings, for, as Wilgis, his occurs in those of Northumbria. The well-known name Speke, written Speak in a Devonshire map, Dr. Charnock refers to Brampford Speke in that county. He remarks, "Lower says the Spekes of Somersetshire descend from Richard le Espek, who lived in the reign of Henry II., but that he is unable to explain Le Espek. A correspondent of *Notes and Queries*, thinks 'Willi le Espec' may be a misreading for 'Willi le Espee,' that is, William the Swordsman, or William of the Sword; another thinks *espec* may mean a *spicer*, who was formerly something between a grocer and a chemist, and he quotes Roquefort, 'Especiaire, épicier, droquiste, apothecaire; de species, specierum.' The O. Fr. *spec* is an inspector."

A curiosity in Dr. Charnock's volume is an autobiographical sketch written almost exclusively in surnames. It purports to be written by Aretchid Kooez. We give a short sample of this mastery of patronymic language:

"Ive Been a Great Traveller, and Such a Walker! Ive Trodden Many Lands, And Wass Once a Pilgrim to Calvary, Galilee, Nazareth, Jordan, Jerusalem, And Gath, without Firman Hor Pass Port. By Jove! the Weather Does Not Stop Mee: Hit His Aul the Same; Fineweather, Fairweather, Merryweather, Even Foulweather. I Delight In Tempest, Snow, Storm, Rain, Shower, Hail, Thaw, Sleet, Frost, Dew Wind, Fog, Mist, Gale. . . . I Once Went to Church; And the Parson, In His Sermon, Said, if One Wass Just, Had Faith And Trust In the Gospel, And Wass a Trueman, in the Cumming World,—*i.e.*, Paradise, Hor Kingdom of Heaven,—One Might Bee a Perfect Man (Watt Bliss!); Butt, if One Wass a Badman, after Getting Off Our Mortal Coil, Thayer Wass a Good Chance of Going to the Devil. Cant Say Hime a Croker, Butt Death, Coffins, Churchyards, Graves, Toombs, And Monuments Air By Noe Means Pleasant Things."

Those who contend the human race is dwarfing and degenerating instead of developing might use for an argument some of the etymological facts newly arrayed before us. The kingly Canute, they might say, has shrunk to Mr. Nutt in our hands. Pele has been clipped and rolled into Pill; the Humphrey of former days is a mere Fry in ours. But it is, as we have said before, the consolations it administers that will form one of the chief sources of popularity of the volume. How consoling to Mr. Silly to know that he is in reality Ceely; for Mr. Shovel to know that his ancestors were Escovilles; for a Smallbone to reflect that his forefathers were Sæbiörns (seabears); for a Slumber to believe one member of his family has been a St. Lambert, if, as our author inquires, there ever was such a saint or sinner; for Slow to return to De la Slo; for the Sextys and Sixtys to know there was a Sacristan in their family in former times; for the Slippers to know they were once sword-grinders, having slipped downwards from the Teut. Schwerdt-Schleiffer; for the Gambles to be able to plume themselves upon having been Fitz-gamels as well as Gumboils (from the gund-bold—bold in war); or for the Gins to know that scholars trace their name to the root of Plantag*enista*, accident alone having made the difference. The Painters, Panters, Pantlings, have had at some time in their generations the post of breadkeeper or *panetarius* either in a monastic or other large establishment; and Paradise, unlikely as it appears to be, also bears within itself the badge of former servitude from the O. G. *paradeus*, a servant. But, to return to our string of instances in which it is consoling to look backward: the Sands, on the contrary, numerous and unpretending as we should suppose them, have probably been sent forth, in former times, as envoys or princely messengers, if we may take the etymological evidence of five languages as an index of their origin. Leaf, seemingly, so valueless, is a corruption of Léof, beloved, precious. Muffin is a contraction of Morfin, a sea-brink. Our author traces Gotobed to Gottbet, pray to God. Deadman should be Debenham, from a place of that name in Suffolk, much to its gain; and Scaredevil may likewise take the name of a town for its origin, this time, perhaps, Ecardenville, Normandy. Such, when given in full, is Ashby-de-la-Zouche. There is a curious evidence of the departure of a name from its original meaning preserved in the parish register of Brenchley, in Kent, where an entry states that in 1612 "John Diamond, son of John du Mont, the Frenchman, was baptized."

Interspersed with the mass of etymological facts there are not a few smart puns upon names introduced, which, however, we must record are not profanely made by Dr. Charnock, but quoted from the American writer, Bowditch, and other sources. Thus, against the name Deed, Deeds, we read, "Doubtless for Daid, Daids; from David, Davids. There is also a Deedy. The Messrs. Deed, of Toronto and of Philadelphia (says Bowditch), may be regarded as the representatives of conveyancing." Again, the same writer says, Abraham Shurt, of Pemaquid (near Bristol, M.E.), took an acknowledgement of an Indian deed in 1826, twenty years before any enactment on that subject, and he dedicates his work "To the memory of A. Shurt, the Father of American Conveyancing, whose Name is associated alike with my Daily Toilet and my Daily Occupation." Against the name Vowell there is another quotation from the same humourist. "Our newspapers mention that a friend informed Dr. Barton that Mr. Vowell was dead. He said 'Vowell dead? *O!* how glad I am that it is not *u* or *i*!'" On another page we read that the *Boston Courier*, in June, 1859, mentioned that Mr. Slim had a narrow escape from drowning.

Against the name Smoker, which Mr. Fergusson thinks may be derived from the Anglo-Saxon *smicere*, elegant, polished,—but which our author deems more likely to be a derivation from the Danish *smuk*, fair, handsome, fine,—there occurs a note to the effect that before the Reform Bill of 1832 was passed, every person at Preston, who had a cottage with a chimney, and used the latter, had a vote, and was called a *smoker*. We can give, however, but one more sample of this phase of the work. It occurs with reference to the name Wisdom. "Mathew Hele, of Holwell, Devon, was high-sheriff of the county the year of Charles II.'s restoration, 1660, and so numerous and influential were the family, that he was enabled to assemble a grand jury, *all of his own name and blood*, gentlemen of estate and quality, which made the judge observe, when he heard Hele of Wisdom, esq., called,—a gentill seat in the parish of Cornwood,—'that he thought they must all be descended from Wisdom, in that they had acquired such considerable fortunes.'" A curious combination occurred at the Liverpool Police-court once, when "the witnesses and solicitor in two cases bore the ominous names of Death, Debt, and Daggers." Our author does not attempt to account for the two last-mentioned. These samples of the anecdotes illustrating some names must not lead to the inference that entertainment is the aim of the writer. These are but as the leaven to the loaf, the work being, in reality, a serious, industrious, instructive series of suggestions, inquiries, and conclusions. As the author remarks, some of the suggestions are but guesses, but, we must add, they are made with the assistance of the discrimination that complete acquaintance with the subject insures. Indeed, if we consider the difference of opinions held by etymologists over the probable radicals of hundreds of words, concerning which it might have been reasonably concluded there was no doubt, there is little more than this that can be said for nine derivations out of ten. Take the famous name of Shakspeare with its variations Shakespeare, Shakespear, Shakespere, Shakespeyre, Shakyspere, Shakespeire, Schakspere, Shaxper, and Chacksper. "Concerning its etymology there can be no doubt," says Lower, as he assigns the ordinary practice of vibrating a spear to ascertain its strength before using it as its origin, and calls Homer to witness; nevertheless, Dr. Charnock sees considerable doubt about the correctness of this view, and suggests that the name of our great poet may be a corruption of Sigisbert, renowned for victory, while Mr. Fergusson thinks that Sicisper, or victorious bear, is more likely to have been the etymon: finally, our author abandons his first conviction, in favour of the supposition that *Jacques Pierre* is the true solution of the riddle; and who shall say which is right? Seeing that, the differences of etymologists rival those with which doctors are solely accredited, it is, perhaps, sufficient to remark that the erudition of the author before us, and the continuity of his philological labours, entitle his opinions to consideration, if not to acceptance. Some curious names he accounts for as the result of a tendency he has observed them to possess of drawing towards a meaning, as in Sweetair, which is evidently merely a slight departure in sound from the German Schweitzer, a Swiss; or Broadfoot, which must have been Bradford; or Wedlock, which must be but a derivation from Wedlake. Gem, from James, with the aid, perhaps, of an intermediate Jim; Giddy, from Gideon; Girl, from Carle, are samples of surnames with English meanings made out of Christian names by force of this tendency. More attractive than these in the brimming volume we here recommend to all interested in the pleasing study of etymology, are the names which the old Scandinavian heroes left among us, among which Rum is a curiosity. This is supposed to have once been *rumr*, a giant, one who, we agree with our author, would, in all ages, have been considered "a rum customer."

THE NEW WATERWORKS AT SWANSEA.

THESE works, just now completed, were designed and carried out by Mr. R. Rawlinson, C.B., assisted by Mr. Edward Cousins, the borough surveyor. The Act of Parliament giving powers to the local board of health to construct reservoirs on the Llan, Lliw, and Blaennant ddw streams was obtained, after a good deal of opposition, in 1860. The Board, determining to proceed in the first instance with the construction of the Lliw reservoir and the necessary conduit, tenders were invited; and, in 1861, that of Mr. Wm. Williams, of Swansea, was accepted. In March, 1862, Mr. Williams commenced work, and in the month of June following the first pipe was laid for the conduit. Tenders were afterwards received for cast-iron pipes, valves, hydrants, and for laying and jointing cast-iron pipes; and contracts were entered into with Messrs. D. Y. Stewart & Co., of Glasgow; Messrs. Guest & Chrimes, of Rotherham; and Mr. Thomas Crump, of Derby, for these works. The conduit and cast-iron main from Morriston to Swansea were vigorously pushed forward; and in June, 1863, or about twelve months after the commencement of the works, they had so far progressed as to admit a supply of spring-water found on the line of conduit being taken to the town, and, on the 8th of November, water flowed to Swansea from the river Lliw, and has done so since. The reservoir was filled to overflowing for the first time on the 24th of October, 1867. From daily gaugings taken in 1867, it was found that 1,000,000,000 gallons of water passed into the conduit from the Lliw reservoir for the supply of the town during the year, being an average of 2,765,000 gallons per day. The estimated quantity of water supplied to the town during the progress of the works is 3,000,000,000 gallons, which, at 2d. per 1,000 gallons, would represent a money value of 25,000*l*. The period has been about four years and a half, so that the benefit to the town of this mode of working has been at the rate of 5,540*l*. per year. The greatest observed daily volume of water in the river Lliw, was on the 13th of January, 1866, when about 143 million gallons flowed down the stream in twenty-four hours. The lowest recorded flow was on the 19th October, 1865, when the volume was about 322,000 gallons in twenty-four hours. All the permanent works of the reservoir, as valves bye-wash, waste weir, &c., are competent to remove safely upwards of 100 millions of gallons of water per day. The drainage area of the Lliw valley above the reservoir embankment, is about 1,860 statute acres, 1 in. of rainfall over which would be 42,077,217 gallons. The area of top water of the reservoir is about 32 acres, the depth of available storage, 64 ft., and the storage capacity about 300,000,000 gallons. The works, as contracted for by Mr. Williams, were for a reservoir to contain only 200,000,000 gallons, and having an embankment 70 ft. in height, the cost of such being 28,071*l*. 10s. 6d.; but in August, 1864, in consequence of the very strong recommendations of Mr. Rawlinson, the enlargement of the reservoir was determined upon by the Local Board of Health, and the embankment raised 12 ft. above contract level, by which means storage for an additional 100,000,000 gallons were obtained. The cost of this additional storage has been about 4,000*l*. The embankment is formed principally of sandy and stony material, with a small portion of gravel, nearly the whole of which was excavated above top water from adjoining land. The embankment is 650 ft. long, and 408 ft. wide in the widest part. It is 82 ft. high in the deepest part above the original surface of the ground, the puddle trench being carried 18 ft.

below this level, or 100 ft. below finished top bank. The embankment is 12 ft. wide at the top, the outer slope 2½ ft. to 1 ft., and the inner slope 3 ft. to 1 ft. in the lower portion, and 2 ft. to 1 ft. in the upper portion. The puddle is 20 ft. thick at the original surface, and 9 ft. thick at the top bank. The puddle wall is supported on both sides by selected material, and the loose, rocky material is placed to add support to its height. There are two outlet culverts,—lower and mid-level. The lower outlet culvert is 8 ft. diameter, and the mid-level outlet culvert 6 ft. diameter, with valves, &c. The two valves in the lower culvert are 64 ft. below top water, and therefore it will not be necessary to work any valve in connexion with the outlet works under a greater pressure of water than 29 ft.—the difference between 35 ft. and 64 ft. The overflow is 46 ft. in length, and is so constructed that at a slight cost arrangements may be made for increasing the depth of water by fixing stop-planks on the top of the coping: an increased depth of 18 in. will give about 20,000,000 gallons of additional storage, which, filled three times a year, the service capacity of the reservoir will be increased some 60,000,000 gallons. The waste-water channel, which is 8 ft. broad, is formed of steps varying from 7 ft. 6 in. to 37 ft. 6 in. long, and having a vertical fall of from about 2 ft. to 4 ft. 6 in. To insure at all times a body of water on each step, and form a fish-ladder, a cast-iron girder or plate 6 in. in depth has been fixed on the edge of each step, and the steps have a fall inwards of about 12 in. The total fall from the top water-line of the reservoir to the river below is 85 ft.; but the velocity and force with which the greatest flood can enter the river from the bye-wash will very little exceed that due to the last fall of about 4 ft. The materials used and work executed in connexion with the Embankment and outlet arrangement are as follow:—

Shipping and trimming surfaces	47,798	square yards.
Soiling slopes	12,098	,,
Pitching inner slope	9,361	,,
Metalling road	1,065	,,
Flagging	156	,,
Earthwork in Embankment	176,150	cubic yards.
Excavation in earth	11,789	,,
Ditto in rock	5,074	,,
Puddle	23,423	,,
Dry rubble work	811	,,
Masonry in mortar	5,206	,,
Ashlar and coping	12,022	,,
Ashlar pitching	6,191	,,

The conduit between the Lliw reservoir and Morriston is 7 miles 339 yards in length, contouring the intervening district, the principal portion being formed of stoneware pipes 2 ft. in diameter. The lengths of the different descriptions of conduit are—stoneware pipes, 6 miles 283 yards; brick culvert, 1,438 yards; cast-iron pipes, 378 yards. Upwards of 4,000,000 gallons of water have passed through the conduit for the supply of the town in twenty-four hours. There are on the line of conduit sixty-three manholes, with moveable covers and ventilators, ten tunnel-shafts and seven wash-outs, or one manhole to each 173 yards. There are also 122 gates on the line of conduit. The cost of the conduit and the works at Morriston has been 20,837*l.* 7*s.* 1*d.* The main from the well at Morriston to the town commences with a pipe of 24 inches diameter, diminishing to 18 inches, of which size it continues to the town. The highest part of the town will have to be supplied from a small service reservoir, proposed to be constructed at an elevation of about 575 ft. above the sea, and into which the water must be pumped either by steam power or by a turbine worked by water from the main flowing into Cwm Donkin reservoir. The highest district at present in operation is supplied from the well at Morriston, the height of which is 291 ft. above ordnance datum, and the greatest pressure is on the pipes under the river Tawe, which are 301 ft. below the Morriston tank. The cast-iron pipes, valves, and works were supplied and executed under contracts entered into with Messrs. D. Y. Stewart & Co. of Glasgow, for pipes, and Messrs. Guest & Chrimes, of Rotherham, for sluice-valves. Mr. Thomas Crump, of Derby, executed the laying of the pipes. The amounts of the several statements are: Messrs. Stewart & Co., cast-iron pipes, 10,885*l.* 18*s.* 5*d.*; Messrs. Guest & Chrimes, for valves and hydrants, 1,123*l.* 6*s.*; Mr. Thomas Crump, for excavating, laying, and jointing, 4,567*l.* 16*s.* 5*d.*: total, 16,580*l.* 0*s.* 10*d.* Upwards of 2,095 tons of cast-iron pipes were supplied by Messrs. Stewart for these works. Summarising the total cost of the works, we find that the contract with Mr. William Williams, for work in connexion with Lliw reservoir, was 32,071*l.* 10*s.* 6*d.*; ditto, for conduit to Morriston, and works in connexion therewith, 20,837*l.* 7*s.* 1*d.*; allowed for completing conduit before specified time, 500*l.*; ditto, for works in connexion with temporary water-supply, cast-iron clips, and stone-ware pipes, 366*l.* 15*s.* 3*d.*: total of Mr. Wm. Williams's contracts, 53,775*l.* 12*s.* 10*d.* Contract with Messrs. D. Y. Stewart & Co., 10,888*l.* 18*s.* 5*d.*; contract with Messrs. Guest & Chrimes, for sluice-valves, &c., 1,123*l.* 6*s.*; contract with Mr. Thomas Crump, for laying pipes, 4,567*l.* 16*s.* 5*d.* Grand total of cost of works, 70,355*l.* 13*s.* 8*d.* The money has been borrowed from the Public Works Loan Commissioners, upon mortgage of the general rates of the town; the repayment being extended over a period of thirty years.

ALEXANDRA PARK, MUSWELL HILL.

ON the 30th of June and the 1st of July next, races will first be run in Alexandra Park. The Grand Stand is finished, the course is all in order, and, on Saturday last, a large number of gentlemen interested in such matters, and others connected with literature, science, and art, were invited to go over the grounds and the Palace, and were afterwards hospitably entertained by the directors, Mr. William Hawes presiding, and efficiently making known the objects of the undertaking.

The Park race-course is formed on slightly undulating ground, commencing near the Wood-green railway station, and extending along the south side of the Palace. It has been drained and levelled throughout, and the turf taken up and carefully relaid on a bed of ballast, to improve its elasticity. The T.Y.C., or 5-furlong course, is 30 yards in width, and nearly straight. The 1¼-mile course commences near the Grand Stand, and joins the 5-furlong course by an easy curve.

The Grand Stand is situated at the west end of the 5-furlong course, and on the edge of the rising ground leading up to the Palace. It is approached by a wide road from Hornsey as well as from the Wood-green station.

The general character of the architecture of the exterior is Italian, with a frontage of steps from the lawn to within the whole length and width of the building. The ground-plan consists of an entrance-hall, 40 ft. by 18 ft., adjoining which are two towers containing the stairs leading to the Grand Stand room and lead flat. On this plan are also first and second class refreshment-rooms, together with entrance to the lawn. The Grand Stand room, 130 ft. by 25 ft., is on the first-floor, and divided into private boxes and stewards' compartment. Adjoining these are the ladies' refreshment-rooms, &c.

Above the Grand Stand room is a graduated lead roof 130 ft. by 25 ft. It struck us that, if the stand had faced a little more towards the east, a greater number of the occupants would have seen the whole race.

The main building is situated on the highest part of the park, commanding on all sides beautiful views of the surrounding country. It is erected partly from the material of the late Exhibition building at Kensington, altered to make it appropriate to its new situation and purposes. The general plan consists of a nave 900 ft. long and 85 ft. wide, a centre transept 430 ft. long and the same width as the nave, and two shorter transepts, each 320 ft. long, the same width also as the nave, and intersecting at a short distance from each end. There are, therefore, three points of intersection of the nave and transepts. The centre has erected over it a great dome, which is 170 ft. in diameter and 220 ft. high in the interior, appropriately panelled and decorated, light being admitted near the top and by lunette windows at the sides. At the intersections of the shorter transepts with the nave there are pendentive octagon cupolas supported on slender columns, lighted by windows in the sides. The ends of the nave and three transepts are terminated with large circular windows, decorated with stained glass.

On each side of the nave and transept are erected buildings about 50 ft. wide and two stories in height; these have brick external walls, with arcaded openings and windows, and form extensive galleries next the nave and transept. The ground-floor on the south-east side will be almost entirely devoted to refreshment and dining rooms, opening by French windows to a verandah overlooking the terrace beyond; and in the basement beneath are extensive and complete cellar and kitchen arrangements.

Other arrangements, such as news, reading, writing, and coffee-rooms, library, museums, picture-galleries, sculpture, plants, and flowers, &c., are all considered, together with many things tending to the entertainment and comfort of the public, and a great organ will form the centre of an orchestra for musical performances on a grand scale. The building will be lighted by gas in an ornamental manner, for evening promenades.

The organ, now in course of erection in the north transept, is of gigantic proportions. It is constructed by Mr. Henry Willis, the builder of the organ in St. George's Hall, at Liverpool. It possesses five claviers, four for the hands and one for the feet, and there are 101 stops, eighty-seven of which are sounding stops. The wind is supplied by two steam-engines, placed in the basement, and remote from the organ itself. The instrument is governed by various contrivances for varying its powers and qualities of tone. Amongst these are the pneumatic pistons for the hands, each clavier possessing six. There is also a complete system of combination pedals, acting precisely as those in the grand organs recently erected in the cathedral at Notre Dame and the church of St. Sulpice at Paris. The cost will be about 6,000*l.*

The interior is elegantly decorated throughout in coloured ornamentation, and is to be filled with objects of beauty and interest arranged in spaces so as not to interfere with the grand avenues for promenade.

Externally, the end of the nave and transepts present eight façades flanked by supporting turrets, containing the large windows and entrances. These façades are united by the walls of the lower buildings, two stories in height, and by the clearstory walls and roof of the nave and transepts, and the whole is terminated by bold cornices and ornamental parapets.

The general character of the architecture of the exterior is Italian, and consists principally of brickwork in colours, with stone dressings and ornamentations. Above the roofs in the centre of the building rises a bold tambour, pierced with windows, from which springs a great dome, terminated at the top by a single balustraded parapet, and a standard mast 50 ft. high. This dome and the octagon cupolas at the smaller intersections are decorated with moulded ribs and panelling in bold relief.

On all sides of the building are spacious terraces, on which, and the ornamental slopes adjoining them, stand many large and handsome trees, giving relief and effect to the building. The terrace on the north-west side, which will be 1,000 ft. long and 160 ft. wide, supported by Italian arcades, will cover a railway-station, from which access will be had directly to the building at the ends of the three transepts, and to which station all the railways of London will ultimately be brought.

At present, however, the nearest railway station is some quarter of a mile from the building, and this has led to a determination, which seems to us to be regrettable, to postpone the opening of the building till the 1st of May next year. The decorations, very light and elegant, and the gilding of the ironwork, are all done, and must suffer, we should fear, during that time. The loss of interest, too, on capital will be considerable. Doubtless, however, the directors have carefully weighed the pros. and cons. Messrs. Lucas & Kelk have erected the building, and contributed a large portion of the capital. For the architectural design and details Mr. John Johnson is responsible, and for the construction and engineering, Mr. A. Meason. The decorations of the interior were executed by Mr. C. H. Schmidt, from Mr. Johnson's designs.

A CURIOUS CLOCK.—A clock of singular workmanship, designed by Raingo the Elder, and of the period of the First Empire, is now on view at M. de Boos's, 20, Down-street, Piccadilly. In the base is a musical box, which plays every hour. The front dial has, in addition to the usual index of time, a record of the days of the week. The signs of the zodiac and days of the month are also registered, and in connexion with these is a mechanical arrangement, exhibiting from day to day the relative positions of the moon, earth, and sun. The whole of this mechanism is worked by three springs.

SELECTED DESIGN FOR THE MANCHESTER TOWN-HALL.

WE illustrate in our present number the design by Mr. Waterhouse for the proposed Town-hall in Manchester, which has been selected by the Corporation of that city. Our view, being taken at the angle, shows the Entrance or Albert-square front, and the Princess-street front. The plan we give is of the one pair or main floor. In a previous number we reviewed the design at some length. On the present occasion we shall confine ourselves to a *resumé* of the designer's own statements, as best calculated to set forth his intentions.

The ground-floor is raised a few steps from the street, thereby gaining a cartway from Lloyd-street into the courtyards on the basement level.

Most of the business rooms look towards the street; the corridors and staircases, on the other hand, are lighted from the internal courts.

The corridors have a minimum width of 10 ft. along the Cooper-street and Lloyd-street sides, and of 12 ft. 6 in. along the Albert-square front. They open out at intervals into wider spaces, convenient for consultations, and which break the monotonous effect of long corridors of uniform width.

A porch and groined entrance-hall (in the centre of Albert-square front), with porter's offices on either hand, lead into the grand staircase hall, 52 ft. by 35 ft. Out of this the main staircases are carried up, by double flights, one on either side, each of them 10 ft. wide, to a similar hall on the main floor, which gives access, on the one hand, to the public hall in the centre of the building, and on the other to the suite of reception rooms. On the ground-floor the principal hall is lighted by the staircase windows on either side.

In addition to the main entrance in Albert-square there are three other principal entrances to the building; one in the centre of the Cooper-street front, another near the corner of Albert-square and Princess-street, and a third near the corner of Albert-square and Lloyd-street.

Each entrance has its porter's office, double-swing doors, one within the other, and close to it one of the three principal staircases placed in the angles of the corridors, which staircases ascend to the uppermost story in the building, and descend to the basement, thus giving direct access to the various stories from the street.

These three principal staircases are circular on plan, and average 21 ft. internal diameter. An open well has been placed in the centre, thus making the steps at their narrow end not less than 11 in. or 12 in. on the tread, with a rise of 5½ in.

There are, in addition to the grand staircase and the three principal business staircases, two secondary flights in the middle of the Princess-street and Lloyd-street corridors, rising up to the third floor. They are united together by a hall or corridor on each floor, thus giving intercommunication between the centres of the Princess-street and Lloyd-street fronts.

The private entrance for the mayor adjoins the public entrance in Princess-street, and is placed there in order that the same porter may command the two. It gives separate access not only to the mayor's private rooms, but to that portion of the Albert-square corridor which runs behind and communicates with the reception rooms.

The public hall is placed in the centre of the building. It would be approached by the public from Albert-square by the grand staircases through a large hall on the main floor, forming a sort of anteroom to it, and adding about one-third more available standing space on the occasion of a crowded town's meeting. The hall is lit on either side by two-light windows. The roof, though of hammer-beam construction, has a ceiling of an average height of only 42 ft. (to render successful the acoustic properties of the room).

In order to prevent outward thrust at so great a height from the ground, the roof is tied across. The walls of the central hall will be of stone, the lower part panelled in oak, with seats in the window recesses. At the farther extremity of the hall are two entrances, with retiring-rooms attached, which communicate with the two secondary central staircases, and the Lloyd-street and Princess-street corridors. Above these retiring-rooms is a gallery for an organ and orchestra, or capable of seating sixty people.

It will be observed that the hall is on the same level as the reception-rooms.

The mayor's reception-rooms front Albert-square; the large committee-room and the council chamber being placed in a line with them, so as to make one magnificent suite of entertaining rooms, 300 ft. in length, and occupying the whole of the principal front of the building on the main floor. These rooms are 23 ft. in height. The space over the main entrance is occupied by the anteroom, which can be approached either by the grand staircases or by the mayor's private staircase.

On one side of the dining-room is a serving-room and butler's pantry, with a staircase and hoist from the kitchen. From this staircase another flight, for servants, leads to the higher portion of the mayor's staircase, and so to his private rooms.

The mayor's private room is in easy communication with the town clerk's.

The cloak-room is placed so as to be easily accessible either from the grand staircase or from the mayor's private staircase.

Above the serving-room, in a mezzanine, are placed lavatories and other conveniences.

The mayor's suite of apartments is placed wholly on the second floor, looking for the most part towards Albert-square. In addition to this suite there is an extra sitting-room over the mayor's business-room, on a rather lower level, approached like the rest of these rooms by the mayor's private staircase.

Below the reception-rooms are placed the kitchens and servants' apartments.

Adjoining the anteroom on the main floor is placed the principal committee-room, so as to be in immediate connexion with the reception-rooms, and only separated from the public hall by the Albert-square corridor.

Annexed is a small serving-room, with staircase and lift down to basement, so that this principal committee-room might be made use of as a supper-room, if required.

Beyond the committee-room comes the anteroom of the council-chamber.

The council-chamber itself will be a well-lighted apartment, with a retiring-room on one side. It is planned so as to be approached by members either from the anteroom or the retiring-room, or, if needful, direct from the corridor. Above the retiring-room is a gallery capable of seating 113 people, with a separate staircase from the principal Lloyd-street entrance.

The other three general committee-rooms are in the centre of the Lloyd-street front, with the committee clerk midway between them and the town clerk and assistant town clerk's rooms.

The town clerk's rooms, connected together by a private corridor, face Princess-street.

The assistant town clerk's rooms adjoin and are brought into close contiguity with the committee-rooms, by a corridor running across the centre of the building.

The clerk of prosecutions is placed immediately over the assistant town clerk, with the Princess-street staircase connecting the rooms.

The treasurer's offices look into Albert-square, and are so placed as to be contiguous to the two entrances nearest the centre of the town, so that persons receiving cheques from other departments could pass the treasurer's offices on their way out of the building.

The surveyor occupies a portion of the main floor looking towards Princess-street, adjacent to the assistant town clerk. His offices have a north light and a private staircase to the room on the second floor.

The Chief Constable is placed in the centre of the building under the public hall, so as to be reached with facility from all the public entrances.

The Lloyd-street staircase leads direct from this department to the committee-rooms on the main floor in the centre of the building. The department is still more contiguous to the committee-rooms on either side of the main entrance.

The water department is placed at the Cooper-street end of the building. On the ground-floor the rooms look into Princess-street, and on the main floor into Lloyd-street. The two floors are connected by a book-lift and by the Cooper-street staircase. From the ground-floor rooms a private staircase descends to the stores in the basement.

The gas offices occupy the centre of the building, chiefly on the Lloyd-street side, and would be approached with equal facility from Lloyd-street and Cooper-street entrances. The rooms on the ground-floor and main floors are connected together by a private staircase and paper-lift.

The building, sanitary and nuisance, and hackney carriage departments are placed on the southern half of the Albert-square side. Doors have been placed across the corridors, cutting off these and the scavenging departments from the rest of the building, and so admitting of the corridors adjoining the departments being used as waiting-halls if desirable.

The scavenging department is on the Lloyd-street side.

The workshops for the weights and measures department are in the Lloyd-street front towards the Cooper-street end, and have a recess for carts to unload.

The markets and paving and highway departments are placed on the Princess-street side of the building.

The court of record is on the ground-floor adjoining the Cooper-street entrance.

The muniment-rooms are in the basement. They intercommunicate and have a separate staircase.

The lamps' department, though in the basement, has a ready approach from the street by the cart entrance.

Large cellars have been provided for coal stores in a central position accessible by the cart entrance, with lifts to the upper floors on either side.

Housemaids' closets have been placed on the different floors.

In addition to the private water-closets, lavatories, &c., connected immediately with the principal officers' rooms, are groups of retiring rooms, in close connexion with all the three staircases in the basement, and on the second floor with the staircases on the Lloyd-street side of the building.

The head porter's rooms are on the third floor, approached from Lloyd-street by a separate entrance and staircase. His rooms are in connexion with a large dining-room in the centre of Lloyd-street front.

With regard to the warming of the building, it is proposed to place in a large sub-basement, three hot-water boilers, two of them for ordinary use, the third as a reserve for use while either of the others was under repair. The smoke from the furnaces will pass through two wrought-iron smoke flues, encased in brickwork, between which and the iron flues will be an intervening space for extracting vitiated air, as hereafter described. From these boilers hot-water pipes will traverse the main corridors, in channels below the floors, everywhere on the window side. These lines of hot-water pipes will form the mains from which coils of pipes, wherever wanted, would be fed.

The prisoners' cells will also be warmed by hot water.

For the extraction of the vitiated air, it is proposed, in the case of the public hall, to have a horizontal air shaft above the ceiling with numerous openings into it, communicating with the two vertical extraction shafts before alluded to. These shafts would be warmed by the boiler fires in the winter and by special means in the summer.

The clock tower and the Cooper-street tower will form convenient means for the extraction of vitiated air from the other portions of the building. Horizontal air flues, carried behind the cornices, will lead to vertical shafts in the angles of the towers, accelerating power being provided as required for summer ventilation, or whenever the reception-rooms happened to be crowded.

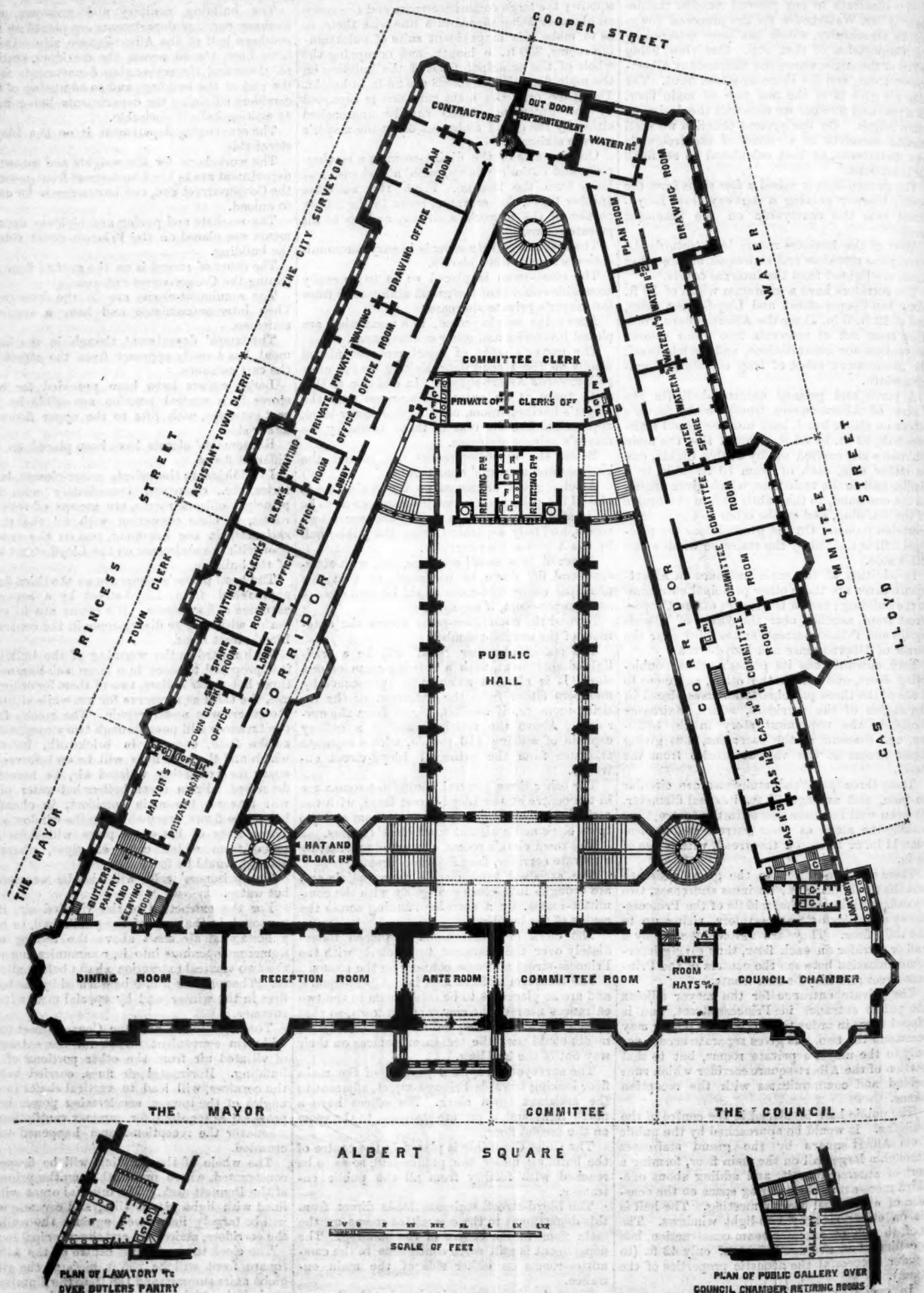
The whole of the building will be fireproof, constructed, where practicable, on the principle of the Dennett arch. The internal areas will be lined with light glazed tiles, and ceramic ware will be largely introduced against the walls of the corridors, staircases, and the principal rooms.

The clock tower in the centre of the Albert-square front will be 235 ft. high to the gilded globe at its summit, and 158 ft. to the illuminated clock dial, which is shown, 15 ft. wide.

At the other end of the building there is a secondary tower, and there is a staircase tower in the Princess-street front, so as to give variety of sky-line.

With regard to cost, the building is designed not to exceed the 250,000*l.* mentioned as the sum the Corporation are prepared to spend.

The building contains, above the ground-floor, exclusive of towers and chimneys, 3,956,815 cubic feet; and below the ground-floor line, 956,518 cubic feet.



A. Serving-room.
B. Lift.
C. Stairs to public gallery.
D. Head porter's stairs.
E. Housemaids' closet.
F. Lavatory.
G. W.C.
H. Safe.

MANCHESTER NEW TOWN HALL.—*Plan of Principal Floor.*

MANCHESTER NEW TOWN HALL: SELECTED DESIGN.—Mr. Alfred Waterhouse, Architect.

MANCHESTER NEW TOWN HALL: SELECTED DESIGN.—Mr. Alfred Waterhouse, Architect.

INSTITUTE OF PAINTERS IN WATER-COLOURS.

THE thirty-fourth exhibition by this society, now open, consists of 316 pictures. The society have strengthened their ranks by the election of a certain number of "honorary members," four of whom, Mdlle. Rosa Bonheur, M. Louis Gallait, Mr. F. Goodall, R.A., and Mr. Millais, R.A., have sent works. Mr. Goodall's "The Arab Messenger" (30), and "Rachel" (205), are important contributions. Mr. E. H. Corbould has a powerful piece of colour, "Salome Dancing before Herod" (53), in which all the light is brought to bear on the figure of Salome. The action depicted is so momentary that the wreath thrown to the dancer has not yet fallen, but rests partly in air, a condition that fatigues. Mr. Louis Haghe has several drawings, of which we prefer 62, A Tribunal of the Holy Inquisition in the Low Countries." Two unpleasant-looking familiars are taking a child to the torture, apparently with a view to work on the parents, who are also present. The general result is less impressive than might be desired. Mr. H. Tidey maintains his position with 10, "Jennie Morrison" (displaying much feeling), and 225, "The Woman of Samaria." Mr. C. Green's picture, "The First Bouquet" (36), will hold the observant visitor some time. It represents "Behind the Scenes," during the performance of a pantomime; a little girl, apparently the clown's daughter, has come off with a bouquet. Various characters are introduced, an inane dandy talking to one of the ballet-girls, and a poor, snarly old man, who holds under his arm the jolly rubicund mask he has worn before the public, not less truthful than many a face of flesh. "Seven A.M." (76), G. G. Kilburne; "Lady and Child" (130), E. H. Wehnert; "A Gipsy Forge at Seville" (163), Mrs. E. Murray; "Happy Hours" (196), Guido Bach; "Bombay Fruit Sellers" (242), Henry Warren; are amongst the other figure subjects that will obtain attention.

"The Children of the Forest" (244) is the largest and most important work sent by Mr. Edmund G. Warren, and is a fine specimen of his manner. A smaller work of his, however, "An English Cornfield" (131), in the back room, gives us even more pleasure. "Mont St. Michel" (20), John Mogford, is an excellent seascape. At sight of "Crossing the Channel" (65), we utter an involuntary "Good Lord, deliver us!" If Mr. W. Bennett got his materials on the spot, he must needs be a good sailor and a brave man. 49, by George Shalders:—

> "Then homeward through the twilight shadows stray,
> Sauntering and slow;"

"Watford, Herts" (277), Mrs. W. Oliver, and some landscapes by Mr. Fahey, Mr. Chas. Vacher (especially the Palace of Rameses III., with the ruins of Luxor in the distance), W. W. Deane, H. G. Hine, R. Beavis, Reed, John Chase, B. R. Green, who continues to increase his collection of architectural subjects, Whymper, Telbin, and others, ought not to escape praise. Mr. Carl Werner's interiors include figure subjects, and have singular merit. "Hareth Ben Herraddin the Notary's House in Cairo" (137), and "The Mufti of the Hafenites at Damascus, sitting near the prayer niche in the Great Mosque" (218), have all the minute fidelity of photographs with breadth and colour superadded.

The sales, we hear, on the private view day, were above the average: so is the collection.

IRRIGATION IN INDIA AND SPAIN.

INSTITUTION OF CIVIL ENGINEERS.

ON April 21st, the first paper read was "On Irrigation in India," by Mr. Allan Wilson. The value of artificial means of irrigation, for increasing the fertility of the soil, was recognized in India at an early date. In the Punjaub, canals for this purpose, as well as for navigation, were constructed as far back as the middle of the fourteenth century. But it was in the southern parts of India, where the rainfall was more precarious, and the river supplies were less easily available, that the most extensive works were to be found. It had been estimated that, prior to the establishment of British rule, there were, in fourteen of the principal irrigated districts of the Madras Presidency, upwards of 43,000 tanks and channels in repair, besides about 10,000 out of repair, having, probably, 30,000 miles of embankments, and 300,000 separate masonry works. Some of these tanks and reservoirs were on an immense scale, for irrigating many thousand acres, while there were smaller tanks, wells, and springs which watered only a few acres. It was remarkable that the Government should have allowed so many fine works gradually to fall into decay, without replacing them by others; as great natural facilities existed for storing water, and for forming canals to lead it on to the land. The irrigation works on the Godavery and Kistna rivers, in the northern Circars, and on the Coleroon, in Tanjore, had only recently been completed; but many large rivers were still allowed to flow into the ocean, almost unused for agricultural purposes.

With regard to the most general and least expensive mode of irrigation by means of artificial reservoirs, and to the methods adopted in forming such reservoirs, it was stated that in selecting a site it was essential to ascertain in the first place that the foundation was suitable; the next point to be determined was the extent of land to be irrigated, and the quantity of water necessary for such irrigation. The area of the drainage or gathering grounds could be estimated from the trigonometrical survey maps of India, and the quantity of water that would pass into the tank during floods should be calculated according to the known rainfall, due allowance being made for absorption and evaporation. With these data, the dimensions of the different works could be fixed. It should, however, be borne in mind, that depth of water was of greater importance than a large surface area, as the evaporation would be less in the former case. An examination should also be made of the valleys in the vicinity of the proposed reservoir, with a view to ascertain whether the surplus water flowing through the tank during floods could not be carried across intervening ridges, and be stored in natural basins at a small outlay, so as to fill a chain of tanks. It was explained that a tank was simply a reservoir formed by throwing an embankment, or bund, as it was called in India, across a valley to dam up the drainage. The most simple description of bund was constructed entirely of earth, which was generally dug from the bed of the intended reservoir. The breadth at the top was usually about 12 ft. The inner slope was 3 to 1, and this was faced with a pitching of loose stone, while the slope of the land side varied from 2 to 1 to 1 to 1. Puddle was seldom, if ever, used; indeed it was not required, as, owing to the lodgment of silt, a tank would puddle itself as soon as it had been once filled. In illustration of this fact it was mentioned, that Major-general Sir Arthur Cotton had stated that in a channel cut through loose sand, within a yard of the water's edge to a depth of 5 ft., not the least moisture was found in the excavation; the lining of silt having rendered it completely watertight. In addition to this embankment, some of the large Hindoo works had a massive retaining wall of masonry in front. Many of these walls were built of dressed stone, close-jointed, backed with rubble and a rough description of concrete; and flights of steps of cut stone were constructed down to the edge of the water.

To obviate the danger of an excessive influx of water during floods, most tanks were provided at one end, and not unfrequently at both ends, of the embankment, with a waste weir (known in India as a calingulah), to allow the surplus water to escape after the tank had been filled. In constructing a tank, the discharge capacity of the calingulah was an essential feature. It was a safe rule to allow one-fourth more than the dimensions obtained by calculation, so that the water might have a free passage in the event of an excessive flood, as otherwise the earthwork might be entirely destroyed. The author had found that many of the tanks which were now useless had been breached from no other apparent cause than the want of sufficient outlet to carry off the surplus water during floods.

With a view of showing how favourable some parts of India were for forming reservoirs of large capacity, attention was directed to a design for a large artificial lake, which it was proposed to construct by damming up the gorge of a valley. This reservoir would be capable of storing sufficient water to irrigate 200,000 acres of land,—an area equal to the county of Buckingham, allowing the usual average of 500 acres to the square mile as being under cultivation. Taking 170,000 acres as the extent of land to be irrigated for a single crop, this would require provision to be made for the discharge of 170,000 cubic yards of water per hour at each end of the tank; and discussion was invited as to the best description of sluice for discharging such a vast volume of water.

A paper was read "On Irrigation in Spain, chiefly in reference to the Construction of the Henares and the Esla Canals in that Country," by Mr. G. Higgin.

It was stated that, of all the countries in the world, there was perhaps none that so much required irrigation as Spain, nor one which so gratefully repaid the labour expended upon it, by rich and valuable results. The climate of the south and east of Spain was suitable for the production of crops of almost all kinds. Productions of the torrid and temperate zones here grow together. In the gardens of Mercia and Valencia might be seen wheat, barley, corn, maize, the orange, the lemon, the date palm, the olive, the citron, the peach, the pear, the apple, rice, pepper. In Malaga and Seville, in addition to these were the sugar-cane, the cotton-plant, the prickly pear, and, in sheltered spots, the plaintain, which was seldom found out of the tropics. The soil of most of the river plains was a rich alluvial deposit, from 3 ft. to 10 ft. in depth. Nothing was wanting but water; and this might frequently be seen a few yards off running to the sea, useless and unproductive. A few charts of comparative rainfall and temperature had been prepared, which showed that, with the exception of Oran, Spain was by far the driest country.

The earliest, and, indeed, almost all the irrigation works in Spain, were constructed about A.D. 800 or A.D. 900, when that country was under the dominion of the Moors. Perhaps the system of irrigation and the whole administration of the waters in Valencia and Murcia were as perfect as well could be, and the results were very surprising. It was not possible, however, within the limits of this paper, to give more than a cursory notice of these works; but such data were collected as would assist in the description of the new canals now in course of construction by the Iberian Irrigation Company. The areas of the several large irrigated districts in Spain were then detailed, amounting together to 680 square miles. According to the published Government returns the total amount of irrigated ground in Spain was 4,439 square miles, so that it would seem that there was an area of 3,759 square miles irrigated from water-wheels, small canals, tanks, &c.,—a quantity which was believed to be excessive. Admitting, however, that the returns were correct, then only 4¼ per cent. of the whole cultivated land was irrigated. While the rate of population in all Spain was only eighty-one to the square mile, in the irrigated garden of Murcia there were 1,681 inhabitants to the square mile, and in Orihuela 767 inhabitants per square mile. The effect of irrigation was to raise the value of land ten, fifteen, or twenty times. Several illustrations of this were cited, and it was stated that, as a rule, all over Spain, good land in the valleys when unirrigated might be bought at an average price of from 6*l.* to 10*l.* per acre, while irrigated ground fetched from 80*l.* to 120*l.* per acre. In proportion to the value of the ground was the value of the water. Colonel Baird Smith gave the value of a cubic foot of water per second in Piedmont at 16*l.* per annum, and in Lombardy at about 15*l.* per annum. In most of the old systems of Spanish irrigation the water was attached to the land, and was sold with it, and the value of the water could not, therefore, be ascertained. But, perhaps, the fair average value of a cubic foot of water per second in Spain might be taken to be that fixed by the Government for the Henares Canal, viz., 375*l.* per annum, which was not considered a high price.

The projects for irrigating the Henares and the Esla valleys were of very old date; but it was only during 1859 that the concessions were granted, and in 1863 that a company was formed in London to carry out the works. The river Henares rose amongst the mountains of the Somosierra: its course was extremely steep, and very rapid; the total fall of the river, from the weir of the new canal to Alcalá, a distance of thirty-six miles, being 407 ft., giving a mean fall of 11·3 ft. per mile. The total length of the new canal was twenty-eight miles. It received its water from the river at a point sixteen miles above Guadalajara, just below the junction of the Sorbe and Henares, and ended at Alcalá. The area of ground capable of irrigation in this valley, after deducting that due to roads, streams, towns, &c., was 27,170 acres. For this purpose the volume of water conceded by the Govern-

ment was 175 cubic feet per second for the nine months from October to June inclusive, and 105 cubic feet per second for the remaining three months. From accurate measurements made near the new weir since the commencement of the works, it appeared that during the months of July, August, and September, the average quantity of water carried by the weir was 210 cubic feet per second, the lowest point which it had touched being 140 cubic feet per second. During the remainder of the year it carried an average of 300 or 400 cubic feet per second; but it was liable to enormous floods, and some came during the progress of the works, which were estimated to amount to 8,000 cubic feet per second. The weir, it was calculated, would discharge 20,000 cubic feet per second.

The most difficult portion of the works was comprised in the first division—involving a rock cutting, 16 ft. in depth, immediately after leaving the river; then a tunnel 3,171 yards in length through a high limestone cliff, followed by a deep cutting in gravel. At the ninth kilomètre the canal crossed the Madrid and Saragossa Railway; and at the tenth kilomètre, a wide torrent bed. These were the ruling points in this section, and it was with reference to them that the actual height of the new weir was fixed. At the site chosen for the weir, the bed of the river was composed of compact clay rock, very impermeable, mixed with strata of excessively hard conglomerate. The front wall was built of rubble in hydraulic mortar, the foundation being benched into the rock. The main body of the weir was of hydraulic concrete; but in order to guard against filtration, a continuous line of cut stone was let into the rock in the centre of the concrete, all the stones being bedded in pure cement. The apron was entirely of cut stone, and from the top of the rubble wall to the crest, the weir was also of cut stone. The water for the canal was drawn off by five sluices, set in masonry arches, built of large blocks of rock-faced ashlar. At the entrance of the canal three sluices were fixed, for the purpose of scouring out any deposits which might accumulate in front of the gates. Immediately inside the head sluices, and forming a portion of the head works, there was an overflow weir, to provide for the discharge of any water which a sudden flood might admit into the canal during the absence of the guard. The weir was 130 yards long between the abutments, and its total cost, including all the head works and the waste weir, had been 17,343*l.*, or 2*l.* 10*s.* per cubic yard, as the mean price of the total cubical contents. Details were given of the prices paid for different classes of work, and of the materials employed. One flood, which came down when the weir was unfinished, tried it severely. The water rose 4 ft. over the crest of the finished portion, completely filling up the gap, and pouring with great force on the exposed concrete hearting of the unfinished end. This flood was estimated to have a volume of more than 9,000 cubic feet per second, yet not a single stone was displaced.

The Esla Canal, as regarded ease of construction, was perhaps one of the best in Spain. The whole estimated cost of the works, including a weir 191 yards long, was a little under 100,000*l.*, and for this amount 32,140 acres would be perfectly irrigated at a cost of 3*l.* 2*s.* per acre, while the cost per acre of the Henares Canal was 7*l.* 7*s.* The land in the Esla Valley was exceptionally rich; it was very thickly populated, and the only objection that could be made to it was its distance from any seaport.

One of the most interesting questions in the construction of an irrigation canal was the acreage which could be irrigated with a certain disposable quantity of water. Opinions varied very much upon this point. The amount supplied in different districts was given, and it was stated that in Spain the usual dotation for rice-crops was considered to be 2¼ litres per second per hectare. It had been found, by M. Ribera, from a series of experiments made near Madrid, that the quantity of water consumed in the irrigation of a nursery garden was 0·36 litre per second per hectare, and for a market garden 0·47 litre per second, in both cases the water being supplied without stint. The author had found, by experiment based on the quantity of water actually employed by cultivators also near Madrid, that ¼ litre per second would irrigate one hectare every twelve days. This, it was thought, was quite sufficient for the cultivation of almost any crop except rice; and taking into account the fact that, in a large valley, such as the Henares, there must always be a great variety of crops, many of which would only require irrigation every twenty or thirty days, it was evident that half a litre per second was a good dotation for a canal. This, in English measure, amounted to 1 cubic foot per second for every 140 acres. The quantity allowed in India varied, it was believed, from 120 to 200 acres per cubic foot per second. The canon fixed by Government for the Henares Canal was equivalent to 3*s.* 9*d.* per irrigation of 450 cubic mètres, and for the Esla Canal, 2*s.* 9½*d.* for the same quantity; the lower price in the latter case being due to the less expensive character of the works. Some particulars of the price of water in Spain were then furnished.

ON THE WATER-SUPPLY OF LONDON.

PROFESSOR FRANKLAND, F.R.S., has been lecturing at the Royal Institution "On the Water Supply of London."

The Professor said that out of every thousand people upon this globe at least three live in London, which fact alone shows the importance of the subject of the water supply of the English metropolis. The water at present supplied to London, he continued, is greatly contaminated with sewage, and it is of hard quality, the first of these characteristics being bad for health and the second bad for washing. A year ago he had brought under the notice of the Royal Institution five or six schemes which had been set afloat for supplying London with better water, and since that date the quality of the water from two of the proposed sources, namely, that of the sources of the Severn in the neighbourhoods of Plinlimmon and Cader Idris, and that of the Cumberland lakes, had been tested by Dr. Odling and himself. The results of those tests he intended then to make known; also two curious facts discovered in the course of the analyses, one revealing the peculiar effect of the detritus from lead mines upon water, and the other the conditions which determine the action or non-action of water upon lead. The samples of water from the sources of the Severn were collected at Cader Idris and Plinlimmon. The projectors of both schemes propose the construction of an aqueduct to carry the water. The one from Cader Idris would be the shortest, but the other would supply many large towns on its way to London. These schemes are not intended to endanger the present large water companies, arrangements to buy them up being included in the estimates; in short, the only effect upon them would be to abolish a certain number of boards of directors. Both plans are very costly. The Welsh scheme is estimated to cost 10,850,000*l.*, and the Cumberland scheme, 13,500,000*l.* These enormous sums, however, need not trouble the ratepayers, the only question for them being how much they will have to pay for the water when one of the plans is carried out. From the calculations of the engineers it appears that after constructing the works and compensating the companies, London will be supplied at a less cost than at present. Now we pay 1*s.* 5*d.* in the pound. On the completion of the Welsh scheme it is estimated that the payments will be 10*d.* in the pound, supplemented by a public rate of 2*d.* in the pound. The payment for Cumberland water would be 1*s.* 1*d.* in the pound. Of course he could not speak as to the entire accuracy of the foregoing estimates, but the figures given show that the enormous capital required need not stagger the Londoners or prevent them from taking the schemes into serious consideration. Where the saving is effected is evident when it is considered that every gallon of water now used in London has first to be pumped up by magnificent steam machinery to a height of from 150 ft. to 200 ft., and even then the supply is intermittent. In the Welsh and Cumberland schemes gravitation will do the work of steam. Why should water be pumped up by these fine engines when the sun is willing to do all the work for us gratis? The sun flings the water up to the tops of our mountains daily, and we in our imbecility let it fall, and go through the work of raising it again by steam. Coal would be saved by economising the power of the sun as proposed, and this is worth consideration when the exhaustion of our mines is a matter for serious thought, even though the saving thus effected would very slightly alter the figures given by Mr. Jevons.

The quality of the proposed waters is also a subject of interest, and in this respect, as shown by tables exhibited by the lecturer, they are much better than the water now supplied to London. The present water supply, he observed, is largely contaminated with sewage, and the fact that this is somewhat oxidised is no guarantee that its noxious properties as regards health are removed. Some of the companies, especially those on the south side of the Thames, supply badly filtered water, and the quality of the water supplied to London is worse than that supplied to any other town whose water he had tested. The specimen of muddy water supplied to Lambeth, which he now placed on the table before them, would show what kind of water could filter through an Act of Parliament. The Lambeth, Vauxhall, and Chelsea Companies had long been supplying badly-filtered water, much worse than that of the New River Company, which delivers the best in London.

Again, the organic matter in water may be of animal or vegetable origin, and this may be judged of to some extent by the proportions of carbon and nitrogen it contains. Nitrogen comes principally from vegetables, and on examination of the tables it would be seen that there is in this respect a vast difference between the Welsh and Cumberland, as compared with the London waters, for the organic matter in the last comes principally from animals.

In the course of the analyses a very curious effect of the detritus of lead mines upon water had been discovered. Water collected near these mines contained very little nitrogen or organic matter, and though full of mineral matter is nearly colourless. The fact is that the finely-divided quartz from the mines has the power of destroying organic matter nearly to the same extent as animal charcoal. It was likewise pointed out that lead would not contaminate the Welsh or Cumberland waters in the supply-pipes. Pure water acts violently upon lead, but it had been discovered in the course of the recent investigations that the presence of a very minute proportion of phosphoric acid in water entirely prevents its action upon lead.

Two of the tables referred to we append.

Previous Sewage or Manure Contamination in 100,000 *parts of various River and Lake Waters.*

Name of Waters.	Ammonia.	Nitrogen as Nitrates and Nitrites.	Previous Sewage Contamination.
River Waters:—			
Nile	—	·102	709
Rhine at Bâle	—	·026	0
Seine at Notre Dame	—	·152	1,200
Ourcq	—	·223	1,910
Thames	·005	·234	2,062
Lea	·002	·220	1,901
Severn (near source)	·003	·007	0
Lower Clywedog	.004	·006	0
Tarannon	·008	·024	0
Ceryst	·001	·052	210
Carno	·003	·049	190
Barnw and Eira	·004	·023	0
Vyrnwy	·003	·011	0
Tylwych	·003	·004	0
Upper Rothay	·003	·002	0
Lowther	·002	·003	0
Kent	·001	·045	140
Sprint	·000	·021	0
Fourteen other Cumberland streams	—	—	0
Lake Waters:—			
Bala Lake	·001	·000	0
Thirlmere	·003	·002	0
Haweswater	·004	·000	0
Ullswater	·003	·005	0
Watendlath Jarn	·002	·006	0
Loch Katrine	·002	·031	0
Five lakes and jarns examined by Boussingault	—	—	0

Soap destroyed 100,000 *lb. of various Waters.*

Name of Waters.	Pounds of soap destroyed.
Metropolitan Waters:—	
Thames water	212
River Lea	204
Kent Co.'s water	205
Other Waters:—	
South Essex Co.'s water	253
Caterham Co.'s water	84
Water supply of Worthing	285
" " Leicester	161
" " Manchester	32
" " Preston	80
" " Glasgow (Loch Katrine)	4
" " Lancaster	1
Bala Lake	5
Thirlmere	8
Haweswater	16
Ullswater	23

THE FOOD RESOURCES OF THE PEOPLE.

SOME interesting information in regard to the food resources of the United Kingdom was given in a paper recently read by Mr. Caird before the Statistical Society, and since reprinted as a pamphlet. The yield of wheat in England, he had estimated eighteen years ago at 26½ bushels per statute acre, and he believes from careful inquiries and observations it would not be safe to take credit now for a greater increase than 1½ bushel; this will bring the present rate of yield up to 28 bushels. The domestic demand for bread-corn in 1863 was satisfied by an expenditure of 40,000,000*l.*, about one-seventh of this sum, 6,000,000*l.*, being paid for foreign grain. Last year, according to Mr. Caird, the necessary supply cost 70,000,000*l.*, and nearly half—*i. e.*, 33,500,000*l.*—was spent for imports. The cost in 1867, as compared with 1863, was therefore raised 30,000,000*l.* against the consumer, but nearly the whole increased payment went out of the country, since we took in value 27,400,000*l.* worth of foreign wheat beyond the imports of the earlier year.

Good and bad harvest years run in cycles of varying length: 1866 and 1867 were both "bad," the former two bushels and the latter six bushels under the average.

For our requirements, till the harvest of 1868 is garnered, Mr. Caird computes that we must depend upon the foreign supply of wheat to the extent of 9,600,000 quarters. A table prepared by Mr. Caird exhibits the results of some rather elaborate calculations to ascertain the average value of the principal agricultural products consumed as food in the United Kingdom.

	Home Production.	Foreign Supply.
Corn	£84,700,000	£25,000,000
Beef and Mutton	47,200,000	6,500,000
Butter and Cheese	30,100,000	8,400,000
Potatoes	18,000,000	200,000
Total	£180,000,000	£40,100,000

Another table compares the value of British with Irish agricultural produce. On the aggregate value, for 100*l.* worth raised in Great Britain 26*l.* was produced in Ireland, the Irish percentage for corn being 14; for cattle, 27; for potatoes, 66; and for flax, 100 (since the growth of this fibre is restricted to the sister Isle), on the respective British values.

An interesting experiment in meat preservation, indicating the possibility of utilising for our own benefit the enormous supplies of animal food in far off countries, has just been completed in America. On March 2nd, a dinner was given at Everett House, New York, for the purpose of eating mutton which was furnished by the carcases of sheep killed and subsequently preserved in England one, two, three, and four months previously by Professor Gamgee, by means chiefly of sulphurous acid. The *Tribune*, speaking of the dinner, remarks that the "meat dishes were pronounced to be excellent, and even far superior to the mutton usually eaten on this side of the Atlantic." Judge Paschal, of Texas, in the course of the evening, remarked that he had often, encountering the great herds of beef which roam over the 270,000 square miles of his own state, asked Bulwer's question, "What will we do with it?" He thought the interrogation answered. Mr. Richardson detailed numerous ways in which he had tested the character of the preserved meat, and gave it as his opinion that the best beef "would soon be sold in New York for four cents a pound." [Mutton, by the way, was sold not long ago in Melbourne, it is said, at 1d. a pound.] The mode employed by Professor Gamgee, in the preservative process, and in which the whole body of the animal is kept entire, is as follows:—

"The beast is made to breathe carbonic oxide gas, by which it is stupefied. It is then bled, killed, and dressed as usual. The carcase is now placed in an air-tight receiver, from which the air is exhausted. The vacuum is filled up by carbonic oxide gas, and a communication is opened between the chamber in which the meat is placed and another containing charcoal charged with sulphurous acid. By this means the meat is impregnated by the gas in such a manner that it may be hung up, and will remain unchanged for, it is said, months."

One way of turning large quantities of foreign or colonial beef and mutton into good wholesome and tasty food for consumption in the country, would be to convert it into the well known and esteemed form of spiced beef and mutton, sometimes, though not quite correctly, called beef and mutton ham.

In a report just published on the subject, Mr. F. T. Buckland states that the salmon fisheries of England and Wales are on the increase, and a hope is held out that by-and-by this description of food will be placed within the reach of those who have hitherto been unable, through its high price, to obtain it. M. Agassiz, in a recent lecture on artificial fish culture, declared, contrary to the accepted opinion, that of all animal substances fish is the best adapted for food for those engaged in mental labour, and is the most nutritious in repairing the wear and tear of the human brain. This is no doubt on account of fish containing much phosphorus. The shining of fish in the dark while decomposing is an ocular manifestation of its richness in phosphorescent material; and, on the other hand, the human brain requires more phosphorus in its composition than any other organ.

The Paris correspondent of the *Post* remarks that the high price of food and the general stagnation of commerce are continually bringing from various parts of Europe distressing accounts of the condition of the working classes. The privations to which the working classes in Italy are exposed are very severe, especially at Turin, where the winters are extremely cold. If provisions are cheaper in Turin than in the large towns of France wages are not so high. For instance, a mason or a carpenter is paid scarcely 2 fr. a day. Most of the curriers receive only 1 fr. 60 c. for a day's work; and the men employed in the manufacture of arms and in the arsenal have little more. The most essential commodities at Turin are very dear; bread is at a higher price than in Paris; salt in Italy is three times dearer than in the French capital. Wine is cheaper; but the workmen scarcely ever drink it except on Sundays. The labouring population are ill-provided with domestic comforts, two-thirds of them sleeping usually, not upon good mattresses, but on maize-straw. The misery of these poor people, says a letter from Turin, is augmented by the indolence and idleness of the women. In this important particular the difference between Turin and Paris is very marked; for, in the latter, a variety of businesses give employment to the women. An idea may be formed of the trifling earnings of the Turin workpeople, from the fact that there are very many instances of a family of four persons living upon 1 fr. 60 c. a day (1s. 4d.).

AGED AND INFIRM WARDS FOR MARYLEBONE.

SOME new wards have been erected for the purpose of relieving the over-crowded state of the house, and providing more suitable accommodation for that class of persons to whom only a workhouse should be made attractive. The Guardians of St. Marylebone are anxious that their aged poor should be made as comfortable as the rules of a workhouse will permit.

The building is erected at the south-east angle of the workhouse ground, and occupies the site of the old bakehouse and laundry.

The wards, six in number, are each 40 ft. wide, 60 ft. long, 13 ft. high, and give 780 cubic feet of air space to each occupant. The beds are ranged down either side of the room, and a double row of beds occupies the centre of the room, which is divided longitudinally by a partition 5 ft. 6 in. high. The western ends of the rooms are formed as large double bay windows, and constitute the day rooms. The skirting at the back of the beds forms a box 9 in. square, with a perforated zinc front; below these boxes are channels containing hot-water pipes; at the ends of these channels, and in the front and back walls, are large openings through which, by raising a damper, is admitted the external air. By this means the fresh air will be first warmed by passing over the hot-water pipes, and then rising upwards be emitted through the perforated front of the skirting boxes into the wards immediately under the beds. The foul air is carried off through wide channels in the ceilings, which communicate with large flues running up the side walls, and terminating just above the level of the eaves of the roof; each opening into a flue is provided with a door that is under the control of the nurses only.

The upper wards are somewhat differently constructed from those of the lower wards, inasmuch as the ceilings follow the line of the sloping sides of the roof, which are supported at intervals on semi-elliptic cast-iron ribs. The emission of foul air in these wards is provided for by a channel in the apex of the ceiling, running the whole length of the room, and has zinc flues at intervals open to the air.

The walls are plastered throughout, the lower portion being finished with Portland cement; they are coloured with varied and pleasing tints, which give them an appearance as cheerful and homely as they are unlike the bare, lime-washed, vault-like brickwork of an ordinary workhouse ward. The basement of the building contains store-rooms, heating-furnaces, coal stores, and other offices.

The total cost of the building as finished for occupation, including every description of fitting, gas-lighting, architect's commission, and all other contingencies, was about 6,400*l.*; and this being for the accommodation of 240 inmates, is at the rate of 27*l.* per bed.

The architect is Mr. H. Saxon Snell; Messrs. Manley & Rogers are the builders; Messrs. Potter & Sons executed the heating, ventilating, and sanitary works; and Messrs. Abercrombie the gas-lighting apparatus.

MURAL PICTURES FOR THE HOUSES OF PARLIAMENT.

Mr. E. M. WARD, R.A., has completed three more of the Illustrations of English History confided to him, and has lately shown them to some of his friends in the trumpery shed which an appreciative Government provides, adjoining Victoria Tower, for distinguished artists. The subjects are,—"The Acquittal of the Seven Bishops," "General Monk Writing to the Parliament," and "William and Mary receiving the Lords and Commons in the Banqueting House." They are painted with all the careful attention to truth and research as to detail that distinguish Mr. Ward's works. The heads are portraits, and if King William look somewhat insignificant, and Monk short-necked and gouty, it is because these were characteristics of the men. We need scarcely say that they are all works of high character.

They may be described at present as simply water-colour pictures on plaster. The question how shall they be made permanent remains to be settled. The artist, we understand, would not object to fixing them as they are and protecting them with a glass, but this is scarcely the right solution of the question. It might, however, be adopted temporarily, pending further inquiry and experiments.

KEBLE COLLEGE, OXFORD.

THE foundation-stone of a new college, dedicated to the memory of the Rev. John Keble, was laid, in Oxford, by the Archbishop of Canterbury, on the 25th ult. The site is almost facing the new museum, and lies between the new park laid out by the university authorities and St. Giles's Church, where hitherto there have been only a few tumble-down houses and half-wasted gardens. Here will be built rooms for 100 students, in wings forming three sides of a quadrangle. The material will be red, white, and grey brick, with stone dressings, and the style will be Early Decorated. Mr. Butterfield is the architect. When additional funds are obtained, the plan will be completed by the erection of a chapel and hall, an entrance gateway, and some additional rooms.

The whole of the spectators afterwards went to the Sheldonian Theatre, which was soon crammed, and various addresses were made. About 35,000*l.* have been subscribed to carry out the idea.

NEW COTTAGE HOSPITALS.

THE memorial stone of one has just been laid by the Countess of Bradford at Walsall. The site consists of about one acre and three-quarters, at the junction of the Wednesbury-road, Bradford-street, and Dudley-street, above which it rises to a considerable height. The soil is sand and gravel. The building is the premises called The Mount, formerly used as a school, and in making the alteration advantage has been taken to utilise and convert every part that could actually be brought into use, with a view to the strictest economy. The main block of buildings now form the administration department. The school-room and the dormitory have been converted into two spacious wards, and the stable buildings have been converted for the washhouse and laundry. The new buildings comprise the

entrance of the kitchen and culinary department, in-patients' department, and out-patients' department. The general arrangement of the building externally is not very pleasing in effect; the architect evidently having brought his judgment to bear upon utility and convenience for the internal arrangement and management, guided by the strictest economy, in which the comfort of the patients, however, has been the prevailing element. The two new wards are designed for eight beds each, giving 1,120 cubic feet to each patient; at the end of each ward are semi-detached buildings forming the bath-rooms and lavatories, the closets and urinals; the architect carrying out the pavilion principle. On the upper floor is a nurse's room, having a command of the upper wards. There are four wards—two on the ground floor and two on the upper floor, the whole arranged to accommodate thirty patients. On the upper floor there is an operating room. The buildings have been carried out from designs, and under the superintendence, of Mr. G. B. Nichols, of West Bromwich and London, architect; Mr. Adkins, of Walsall, being the builder.

The committee recently appointed under the presidency of the Hon. and Rev. K. H. Digby, of Tittleshall, have determined to make such preparations as will enable a Cottage Hospital to be opened at Litcham on the 1st of July.

WEST LONDON SCHOOL OF ART.

THE committee of the West London School of Art, Great Portland-street, have issued a statement of the extent and success of the school's work, and its financial position, with the view of obtaining subscriptions to pay off existing liabilities to the amount of 400*l*. One of the strong grounds on which they appeal to the public is that the establishment is essentially an artisan school, and, though the latest established of the ten metropolitan schools of art, this school is teaching more than a fourth of the entire number of artisans (1,750) taught in the whole of the ten London schools; and an analysis of the occupations of those attending the school during 1867 suggests in a general way the advantage gradually being derived by a great number of local industries. The Examiners' Report on Schools of Art for 1867 shows that, among the 100 existing schools in the kingdom, only five schools had a greater number of students under instruction; only five had a greater number of students examined; and only three sent up sets of works for examination from a greater number of students during the year.

This school obtained the greatest number of prizes taken by any school in 1866, the National Art Training School at South Kensington alone excepted. The Examiners' Report for 1867 also shows that only two schools passed a greater number of students in the personal examination; and only two schools obtained a greater number of prizes upon the sets of works sent up for examination during that year.

THE NUT FOR PROFESSIONS TO CRACK.

II. PAYMENT OF ENGINEERS.

SIR,—Though I have long ago stated in the *Builder*, more than once or twice, my solution of the standing "nut" that "A Country Gentleman" has once more brought before you as regards architects—(I did so last in 1865, October 25th, p. 829),—and have never met with or elicited any objection to it, I cannot learn of any engineer having applied similar principles to the regulation of his claims, and will therefore ask for a column to suggest what appears to me the parallel method for most of the work now special to that profession.

In a healthy state of morals and education these would not be two professions. The engineer's, which is the mother profession, and bears the older, indeed the sole indigenous English name—for "Elias the Enginyer" was the name and style of the artist of this empire's grandest work of art, Salisbury Cathedral—this original profession would have continued in such culture as never to require supplementing with the off-shoot, or rival school of pedantic tastemongers, begun by Inigo Jones, and dubbing themselves with the affected classic euphuism of "*architect*," which of course is only barbarised Greek for the native term "*engineer*." It is quite right, therefore, that these dilettanti should be confined, as they are, to one part (and the smaller that part the better) of the practice of the engineer (or real ἀρχιτεκτος of the ancients); while this latter, of course, includes, and must always include, all the modern "architect's" province, and much besides.

As far, then, as the engineer does what is called a modern architect's work,—that is habitable buildings of any kind,—I assume his basis of charge to be the same as mine, the area of internal floor space. I have explained (if so simple a thing really needs explanation) why there must be no cubing, but only squaring of dimensions, and why they must be internal. Of course, too, the engineer can get, as I do, for all unnecessarily varied detail, its market value,—that is, if there are twenty features of the same position, dimensions, and use, I lay before my employer as many sketches for one as I think suitable, be they two or a hundred, with a price on each; and he pays without demur invariably my prices for such of them as he likes to have carried out, be they the twenty dearest or only the one cheapest. For the mere charge per square of floors I only hold myself strictly bound (though I should never, perhaps, do so little) to make the details all alike, even on different stories, which (though the most impudent thing a shameless percentager can possibly do) does not hinder the Record Office in Fetter-lane from being, *on the whole*, to my taste, the least offensive modern work I know in the whole Isle of Percentland.

As for different prices per floor-square, I really do not believe any single artist need have more than one. A lower price would, doubtless, be fair for warehouses, and perhaps the larger sort of workshops and mills. But in aught else there seems a kind of compensation between utilitarian design and artistic. To make an exterior plain and good may as often be harder as easier than to make it rich and good; and if a church needs more artistic study, height, proportion, and better construction than a house, so it does less division and contrived arrangement. The addition I once reckoned by the exposed girth of each story is really a needless refinement. Architect's work will be best done when paid *only* on the two bases above described.

But now, coming to the wider provinces of work rightly held peculiar to the engineer, we shall find by far the largest of them, indeed their vast majority at present, fall under the general head of *ways*, always the kind second only to shelters in importance. Under "ways" of course I mean to include ways for any and everything, trains, ships, barges, carriages, foot passengers, letter-bags, water, fire, gas, or electricity. Now, it is common to all such ways to unite two given termini, and to be at a more or less variable height or depth above or below (or both above and below) the natural surface. Moreover, in the parts that are raised above that natural ground-line, certain areas of void require to be left for subways, culverts, &c. For each of these classes of ways, then, I would let the engineer's pay be composed of two parts; one based on the area of longitudinal section of the whole line of work, as included between the natural ground-line and the finished way,—the other similarly reckoned on the area of all subway openings. I would have no extra for superways over the sunk parts of the line, because their need and their dimensions are created by the engineer's own design, and the numbers of them to be expected being always practically uniform, they should be included in his general price as things of course. Moreover, observe that the area of longitudinal section of the whole line must always be reduced in the ratio that the direct distance of the termini bears to the line's length. This will not, as might at first appear, give the engineer much interest in taking you straight rather than roundabout, but rather make length of detour indifferent to him (which would otherwise be advantageous). For, suppose two points fifteen miles apart are joined by one road of sixteen miles, and another of twenty miles. If, as is probable, their longitudinal section-areas were in about the same ratio, say 16,000,000 and 20,000,000 square feet, both being reduced by this rule to 15,000,000, would pay their engineers the very same fee.

You will observe that *width does not enter my equation*. I think it fair that a work of a given class and a given longitudinal section should invariably pay its engineer the same fee, whether it be 10 ft. wide or 100 ft. Take a bridge, for instance, as the class of work to be charged on the highest scale (but all bridges, without exception, on the same scale). Had Westminster Bridge been required only for a footway, or an aqueduct, on the other hand, of double its present width, I do not see, in either case, what part of the engineer's duty would have been *materially* lessened or increased. Hence I exclude *width* from the bases of the way-engineer's charge, as I do *height* from those of the shelter-engineer (or "architect").

Among those few engineering works that come not under the head of Ways, I think all docks ought to pay by a uniform scale on their cube water-space; but for reservoirs of water (or gas, &c.), as the merit and utility of the work is greater the less ground it occupies, the cube contents ought to be divided by the square root of the outside area occupied by the work and all its necessary adjuncts. You must not divide by the area, but only by its square root; otherwise a great and a small reservoir, of the same average height, would pay the same, which is not intended.

I may beg space for a word or two on this "Nut," as regards some other trades and professions.

EDWARD L. GARBETT.

CURE FOR A SMOKY CHIMNEY.

I OFTEN see in your journal remarks on what is called "the Smoky Chimney question;" and complaints are constantly made against architects and builders for smoky rooms; therefore I suppose you will not object to make public a cheap, simple, and sure remedy for eight out of every ten bad chimneys, without the requirement of unsightly chimney-pots. I find from experience that, by the use of fine wire gauze, of from 36 to 40 wires to the inch, as a screen, blower, or guard, judiciously applied to register stoves, ranges, or stove doors, little if any smoke will come into a room. The atmospheric pressure prevents the smoke entering the room through the gauze; and if applied immediately to the front of the fire, more smoke will be consumed than by any other means. In that case the wire should be kept 2 in. from immediate contact with the hot fire.

Any respectable ironmonger will readily supply both cheap and ornamental screens of this kind, either as permanent or movable.

I. O. U.

RECREATION AND WORK.

SIR,—I have but just now seen the letter in your impression of the 28th of March, commenting upon a remark made in my paper read before the Society of Arts on Technical Education. The writer takes exception to the passage in which I stated that I looked upon the pursuit of geology in my case as a recreation merely. He says he is of opinion that "it ought not to be looked upon as merely recreative; neither does it prove so." Our friend appears to have as great a dread of recreation as others would have of work. Why, sir, work and recreation are relative terms, and if one can convert what to another is right down hard work into recreation, or the means of it, so much the better. It depends much upon circumstances, and upon the light in which it is viewed, together with its results, whether a pursuit is recreative or not. Work with me is not irksome. I attend to it, and am dependent upon it, and my wages are equal to any in the same manufactory. I also find time to write for the press what brings a handsome addition to my income; and, would your correspondent believe it, I do this by way of recreation, rather than from the profit derived therefrom. But with respect to geology, I regard my pursuits in that line as having been eminently *recreative*. Geology with me has converted this earth, which some soured individuals persist in regarding as "a desert," and "a bowling wilderness," into a very paradise, full of good and beautiful things, which it is a source of great gratification to me to become familiar with. It brings me face to face with nature, takes me down into deep dingles, and up to the summit of great hills; and whilst it stores my mind, and supplies that food for which it craves, it has a *re-creative* effect upon my entire system, imparting vigour to the body and elasticity to the spirit.

But your correspondent, I have no doubt, will see that he has mistaken my meaning altogether, when he comes to look again at the passage he quotes and its connexion. My argument was that if a working man could gain the distinction

of being elected a Fellow of the Geological Society of England in consequence of studies in a science which had been pursued merely as a recreation, why should there not be some means whereby similar distinctions could be awarded "to men who devoted their energies to the attainment of excellence in their own particular business"? The passage occurs at the close of the discussion, in urging the necessity of district colleges, which should have the power of conferring such distinctions, and is as follows:

"He thought it would be well, if these district colleges should be established, that they had the power of conferring honorary distinctions upon such persons as showed themselves worthy of them in their particular calling. He had been made a Fellow of the Geological Society in consequence of his studies in that science, which he looked upon merely as a recreation; and if some similar distinction were awarded to men who devoted their energies to the attainment of excellence in their particular business, it would be very likely to have a very beneficial effect, especially on the rising generation."

JOHN RANDALL, F.G.S.

TEMPLE BAR AND OLD ARCHWAYS.

HAVING long outlived its period, it is difficult to imagine wherefore this ancient gateway is suffered to obstruct the traffic of the most central and crowded City thoroughfare: there is barely room for two vehicles to pass together under the arch, and the footway on either side will only admit of two pedestrians abreast; whereas, by the removal of the crazy old structure, the causeway in this, the narrowest strait of the whole line, would freely admit three carriages, and the footway four persons on either side.

The line of Fleet-street westward from St. Dunstan's Church gradually narrows towards the Bar, as it does also from Clement's Danes eastward; so that, to make the width of causeway at all equable or adapted to the roulage of this great and leading thoroughfare, the whole line from Chancery-lane to the space cleared for the new Law Courts should be opened, and the frontages withdrawn at least 10 ft. in a graduated line.

There are impediments in the way, for one side of the arch is occupied as a barber's shop and cutting-room; and the other, together with the small chamber above the arch, has been the appanage of Child's Bank, time out of mind, probably for the amusement of children to see Lord Mayors' shows.

If there exists a corporate veneration for their ancient relique of the Bar, can they not find out a favourable location for it somewhere? But let them not reconstruct it over any great leading thoroughfare, where it must cause an arterial constriction, or an aneurism in the heart of commerce.

Another ancient gateway, possessing architectural pretensions of a higher order, which formerly opened its portals to royal processions, now seems to sink unheeded into the slime of the Thames; it is buried to the top of its pilasters in heaped rubbish, and must be taken down, but —it must be reconstructed. QUONDAM.

THE TENDERS FOR THE HORNCASTLE SEWERAGE.

SIR,—The list of tenders for the sewerage of Horncastle given in the *Builder* for April 25th, is followed by some remarks conveying a false impression; and as my name is given in connexion with the statements there made, it seems due to myself and the Board to set ourselves right with your readers.

Mr. Young did not plead an error, nor was he allowed to make any private proposal to the Board, nor did he ask to be allowed to do so; nor was he allowed to alter one figure in his tender as regarded the works for which the other parties tendered. Compared with the others, item by item, he was all along the lowest. What really occurred was this: the applications for copies of the specifications were so numerous that when Mr. Young applied the specification was out of print, and only the bill of quantities was sent to him. In the bill of quantities mention was made of certain castings, which the specification showed the contractor was only *to fix*; but Mr. Young, not having the specification before him, included the cost price of the castings. This cost price was not included in any other tender, and therefore was very properly struck out of Mr. Young's, to put him on a level with the rest; which being done, he was the lowest, and his tender was accepted.

I hope Mr. Frow was not one of those who supplied to you the erroneous statement, because he was in possession of the real facts of the case, as the following extracts from our minutes will show:—

"Board Room, Horncastle, 9th April, 1868.

A letter from Mr. Frow was read, complaining of the non-acceptance of his tender, when the clerk was directed to reply that Mr. Young was not allowed to lower any item for which Mr. Frow had tendered; and so far as they had tendered for the same works, Mr. Young was all along the lowest; and, moreover, the board never bound themselves to accept the lowest or any tender."

W. H. MILNER.

MODELLING.

SIR,—Will some one inform me what is the material to model in which does not shrink or crack in drying?

I have modelled a good deal, as an amateur, in clay, and made my waste and piece moulds; but this is too much trouble for the sake of one copy; and, besides, the modelling I now allude to is not suited to this method of casting, but must remain in the modelling material: I mean those pet spaniels from life, and figures elaborately undercut and delicately light and gauzy in the drapery. I have seen many such objects from Italy, and I thought the material was an earth found there; but I have since been informed that it is a composition resembling modelling-clay made in England, though I have not yet been able to get any of it. PETIOLANA.

"THE IRON MOP."

SIR,—Will you kindly get an answer to a query arising out of the excellent letter which you lately inserted from the pen of a Canadian lady?

What is the "Iron Mop" that is to supersede the labours of our housemaidens? Where can it be produced? and *how* does it perform its functions?

A well-caulked deck, with convenient scupper-holes, may indeed be scrubbed and sluiced at arm's length; but how can we remove dirt and superfluous water from an ordinary floor (*without damage to ceilings beneath*), unless by the deprecated process of "going down upon our knees?"

A reply will greatly benefit many old housekeepers, besides a constant reader of the *Builder* and

Your humble servant, DOLLY.

*** The floors alluded to by our Canadian correspondent had evidently no ceilings beneath.

PROVINCIAL NEWS.

Stockport.—The workmen and others engaged in the erection of the bridge connecting St. Peter's Gate with the Market-place, to the number of about forty, have been entertained at supper, at the Egerton Arms, in celebration of the completion of the work. The chair was taken by Mr. James Whitaker, one of the assignees appointed by the corporation to carry out Mr. Pierce's contract; and the vice-chairs were occupied by Mr. George Roy (the other assignee), Mr. John Whitaker, jun., and Mr. Simpson, assistant to Mr. Brierley, C.E., by whom the plans were made, and who has personally superintended the work.

Kingston (Surrey).—It having been found by the guardians during the severest part of the winter that additional accommodation was necessary for inmates, the subject was discussed and a committee appointed to consider the question. The committee unanimously recommended the Board to increase the buildings of the house, so as to accommodate 200 additional inmates, and they approved of Mr. Luck's plans for the proposed alteration. The Board of Guardians however, by a vote of eight to four, have decided that the alteration of the house, which was estimated to cost about 10,000*l.*, should be deferred at all events till the new infirmary is completed, as it was thought by some that the new infirmary would relieve the house of some cases, and so afford a certain amount of room.

Cambridge.—The market committee are considering the question of a new corn-exchange. The council had referred the matter to the committee, and a report has been drawn up strongly recommending the building of a new corn exchange. Three sites have been considered, but the most eligible one is said to be in Wheeler-street, upon property known as Parson's-court.

Rochdale.—At a meeting of the estate committee of the corporation, after a lengthened discussion, it has been decided to commence the proposed alterations and improvements in the Guildhall of this city forthwith, from the plans proposed by Mr. H. Andrews, the city surveyor. The alterations to be effected will include improvements in the portion of the Guildhall devoted to the magistrates, and a renovation of the interior of the old hall.

Worcester.—The three slaughter-houses ordered by the Town Council to be erected at the north-west end of the Cattle-market approach completion. They have been built according to the plans of Mr. Rowe, city architect. The houses are lofty and have ventilating cupolas. At the rear of each house are fasting pens, from which the beasts are brought for slaughter. There are in addition a boiling-house and other requisite offices for obtaining water, &c. The whole is well drained.

Wigan.—At the next quarter sessions of the peace for the county, the following resolution is to be moved:—"That a plot of land containing 340 square yards, or thereabouts, situated at Ince, in the division of Wigan, be taken on lease for the term of 999 years, at a yearly rent of 5*l.* 13*s.* 4*d.*, and that a police-station and strong rooms for the temporary confinement of prisoners be erected thereon; and that for this purpose a sum not exceeding 890*l.* be granted out of the police rates of the division of Wigan."

Stratford.—The chief stone of the new Town-hall has been laid. The building will be in brick, with stone facings, and will comprise extensive cellarage on the basement floor, and above this will be the board-room of the Board of Health, with clerks' rooms, and suitable offices; board-room for the meetings of the Board of Guardians, offices, &c.; and the plans also provide a justice-room for the magistrates of the division. The architects are Messrs. Angell & Giles. Mr. Thomas Ennor is the contractor, and the amount of the contract, exclusive of four or five hundred pounds for cellarage, which was forgotten at the outset, was 10,239*l.*

CHURCH-BUILDING NEWS.

Louth (Lincolnshire).—Legbourne Church has been re-opened. For some months past it has been undergoing restoration. In the nave, chancel, and aisles, nothing of the old church remains, except the stonework of the walls, arches, and windows. The woodwork of the roof is new. The old lead has been re-cast. New seats and flooring have taken the place of the old pews and decayed floor. There is a new organ (by Messrs. Foster & Andrews, Hull), new pulpit, lectern, and reading-desk. In the stonework of the nave arches and the windows the mouldings are of a simple character, and there is no carving in stone. The carved oak screen which formerly occupied the chancel arch has been restored and replaced there by Mr. J. L. Fytche. Two chapels are formed at the east end of each aisle by carved oak screens. The nave and aisles are filled with open seats of pine. The fittings of the chancel correspond with those of the nave as to design. The stonework of the exterior has been repaired, and where it had been previously repaired with brick the brickwork has been removed and stone inserted. The architects employed were Messrs. Rogers & Marsden; and the builder, was Mr. M. J. Thompson, Louth.

Wilcote.—The parish church has been re-opened for Divine service, after having been closed since last September, for the purpose of undergoing a restoration, under the superintendence of Mr. A. W. Blomfield, of London, architect. It was found that only the walls of the old church were in a condition to be left up, so that the restoration comprises, besides a new porch, new roofs, floors, doors, windows, and fittings. All the wood-work is oak. The roof of the nave has a deep cornice on the wall-plates, moulded principals and purlins, the circular ribs carved in the spandrels, and the space above the collar-beam filled in with cusped tracery. The roof is covered at the backs of the rafters with oak boarding. The chancel-roof is boarded, and divided into panels by moulded ribs, with carved bosses at the intersections. The seats in the nave have tracery in the panels of the bench ends, and the fronts of the book-boards. The pulpit and prayer-desk are moulded, and have open tracery work in front, with a considerable amount of carved work. The font is in stone, with oak top and ornamental iron-work. The altar is of oak, with carved panels in front, and the altar-rail is supported on pillars, carved and moulded. The floor (except under the seats, being there of wood) is laid with tiles and pieces of stone alternately, some of the tiles glazed and some plain. The masonry has all been restored, and a bell-turret added to the west gable,—the old turret having been gone for many years. The east window has been made somewhat larger, and filled in with stained glass, the subject being the parable of the "Good Seed," executed by Messrs. Heaton, Butler, & Bayne, of London, who also supplied the mosaic-work over the altar. The other windows are filled in with cathedral glass in small quarries, with a narrow ruby border, the two quatrefoils of the west windows being occupied with the arms of the Pickering family. This restoration has been carried out at the sole cost of Mr. Leonard Pickering, of Wilcote Grove. Mr. Joseph Castle, builder, of Oxford, executed the works, and the carving was done by Mr. Chapman.

Blackheath (Worcestershire).—The memorial stone of a new church at Blackheath, Rowley, has been laid by the Countess of Dudley. The

intended church has been designed by Mr. Hopkins, architect to the Worcester Archidiaconal Church Building Society, and the building will be erected by Mr. Wilson, of Birmingham. The estimated cost is 6,400*l.*, of which 5,071*l.* (including 2,000*l.* from the Earl of Dudley and 2,000*l.* from "Delta") have been collected. The church will, when completed, accommodate 850 persons, and contain a nave, north and south aisles, vestry, organ-chamber, and children's chapel. The church is to be built of bricks. The nave is 80 ft. in length, 29 ft. wide, and 54 ft. high.

Liverpool.—The chief stone of St. Saviour's New Church, Breckfield-road North, Everton, has been laid. It will accommodate a congregation of 900; and the style of architecture is that of the end of the thirteenth century. According to the plans, it will consist of a nave with two aisles, and of a chancel with two chantries. The length of the nave and chancel will be 109 ft. The nave will have a clearstory, and its walls will reach to a height of 47 ft., the height to the ridge of the roof being about 70 ft. The church will have three entrances from Breckfield-road North,—one with the centre of the nave, and the other two by porches, one of the latter being intended to serve as a base for a tower and spire, which it is hoped will be raised at a future time. The roof will be an open one, and that portion over the aisle will be supported by cross arches of masonry, instead of by timber framings. The chancel-window will have five lights; it will contain 230 ft. of glass. At the opposite end of the building will be another large window, having four lights, with tracery in the head, and a rose-window over. The arches at the side of the nave will be of 21 ft. span, 17 ft. to the spring, and the height will be 27 ft. There will be three of those arches at each side, and the arrangement is such that the chancel and chantry arches will spring at the same level. The material to be used is principally the native red sandstone. The walls are already 5 ft. above the floor. Wrought stone is used throughout. In the chancel, and for the main part of the dressings, white Stourton stone is being used, and the pillars and other portions of the erection, which will have to support a heavy weight, will be of Cefn stone, with red Mansfield stone in the smaller shafts. The pavement will be of Staffordshire tiles, with stone borders, except in the chancel, where Minton's tiles will be used. The roofs will be covered with green slate, from Wales. The seats will be of pitch-pine, and there will be no gallery; but one-half of the sittings will be free. The entire cost of the building itself will be about 6,400*l.*, and the cost of the site is 1,500*l.*, of which 1,000*l.* have been contributed by Mr. F. A. Hamilton, and the remainder by the Church Extension Society, who have also given 3,000*l.* towards the building of the church. The architect is Mr. Gordon M. Hills, of London; the contractor, Mr. Tomkinson, of Liverpool; and the clerk of works, Mr. James Howes.

DISSENTING CHURCH-BUILDING NEWS.

Parkgate, near Rotherham.—A new chapel, erected by the members of the United Methodist Free Church, has been opened at Parkgate. The new building is of stone, in the Early English style of architecture, and surmounted by a tower and spire. In the basement below the chapel is a schoolroom. The total cost of the erection has been 2,600*l.* Messrs. Blackmoor & Mitchell-Withers, of Rotherham, have been the architects; and Messrs. Askew, Brothers, of Parkgate, the builders.

Birkenhead.—A new church, to be called "The Hamilton English Presbyterian Church," has just been commenced in Laird-street. It is intended to accommodate 620 persons. The contract is being carried out by Messrs. R. Anderson & Sons, of Liverpool, for the sum of 2,200*l.* Mr. James N. Crofts, of Liverpool, is the architect. The lecture-hall, which does not form part of the contract, will not be commenced at present. It will be placed at the back of the church.

Shipley.—A new Moravian chapel has recently been erected at Baildon. The style is Gothic, and in size the edifice is capable of accommodating between 600 or 700 people. All the sittings are to be free. The cost of the erection is 1,400*l.*, towards which about 1,000*l.* have been subscribed. Mr. Samuel Jackson, of Bradford, is the architect.

Chipping-Norton.—The new Wesleyan Chapel has been opened. This chapel is situated in one of the principal thoroughfares of the town. It is built in the Italian style of architecture, from designs by Mr. W. Peachey, of Darlington, the builder being Mr. C. Young: it will accommodate upwards of 500 persons.

Kidderminster.—The new chapel which the Baptists have been erecting in a central part of the town has been opened. The building stands in Church-street. It has a Gothic front, and two flights of steps lead up from the entrance part to the doors giving access to the interior. The area of the chapel is 72 ft. by 40 ft., and it will seat about 600. Underneath the chapel are a large school-room and four class-rooms, and they will accommodate about 400 scholars. The work has been carried out by Messrs. Scholes & Warrington, from the designs of Mr. Bidlake, of Wolverhampton. The total cost, including site, will be about 2,400*l.*

Farsley.—The foundation-stone of a new Baptist chapel has been laid at Farsley. The edifice, which is to be built from the designs of Mr. John Simpson, of Leeds, will be 90 ft. by 45 ft., inside measurement, and 40 ft. from the floor to the crown of the segmental ceiling. The walls will be built of Horsforth stone, lined on the inside with brick. The style of architecture will be the Italian, with a bold stone cornice and rusticated quoins at the angles, and moulded dressings to the whole of the windows. The principal entrance will be a portico, with rectangular rusticated piers, surmounted by an entablature and ornamental vases. The edifice will seat 1,100 persons; and the total cost of it, including fencing, lighting, and warming, will be 3,500*l.*, towards which at least 2,000*l.* have been already obtained.

Bowdon.—The Congregational Church on Bowdon Downs has been re-opened for divine service. The nave or body of the building has been prolonged westward as far as the site would permit, and transepts have been added on both north and south sides. Each transept is divided from the body of the church by two arches supported by double columns. These columns are in two tiers, the lower portion connected together by carved capitals, carrying the principal support of galleries, the upper portion supporting the arches having similar capitals. There are galleries provided in each transept, the separate means of access to each being well arranged. There are also two new vestries. The style of architecture in the enlargement is Gothic, of the Early Perpendicular period, the old portion of the building being also Perpendicular, but of a debased character. The new west end and each of the transepts have large wheel-windows in the gables of different and original designs, and two windows of two-lights each under, the heads of the windows being filled with tracing of the Perpendicular type. The wheel-windows in the transepts lighting the galleries is the same. The gables are surmounted by crosses. There is additional accommodation provided for about 530 persons. The works have been carried out from the designs and under the superintendence of Mr. Ernest Bates, architect, Manchester, and we believe it is in contemplation further to improve the building, particularly the part facing the Downs.

STAINED GLASS.

Congregational Church, Ramsbottom.—A large stained glass window has been placed in the west end of the new Congregational Church, Stubbin's Vale, near Ramsbottom, co. Lancaster, in memory of the late wife of Mr. Joshua Townsend. The window is composed of five openings and tracery. In these openings are figures, life size, of our Lord in the centre, with the four Evangelists, two on each side, beneath canopies. Under these, and forming the base of the window, are smaller canopies, the central being occupied by a figure of David, king and prophet; and the side canopies are filled with the emblems of Evangelists, bearing scrolls, on which are inscribed the beginning verse of each Gospel. The tracery is filled with inscribed scrolls, monograms, and foliated works. In addition to this window the whole of the glass in the church is of an ornamental character, consisting of geometric work in different tints of cathedral glass and coloured borders. The windows are from the establishment of Messrs. B. B. Edmundson & Son, of Manchester.

Church Preen.—This little parish church has lately received an additional adornment in the form of a large stained-glass window, placed in the chancel by Mr. Arthur Sparrow (the patron), as a memorial of his father, the late Mr. William Hanbury Sparrow, of Penn, in the county of Stafford, and lord of the manor of Church Preen, by whose liberality the restoration of the church was principally effected two years ago. The figures on the window represent nine events in the life of our Saviour, viz.—Magi, Presentation, Christ with the Doctors, Baptism, Temptation, Agony, Crucifixion, Resurrection, and Ascension. It was executed and supplied by Mr. Frederick Preedy, London.

St. Stephen's Church, Carlisle.—Miss Burdett Coutts has filled with stained glass the windows of the west end of this church, at a cost of about 300*l.* Messrs. John Scott & Son, Rickergate, Carlisle, furnished designs for the windows, the firm having already filled with stained glass for Miss Coutts the east windows of the edifice. The main window is composed of four lights; and the history of Stephen having been chosen as the subject for illustration, each of the four lights is devoted to an incident in the martyr's life. Each group is under a crocketed canopy, and in the tracery above these canopies a demi-figure of Christ is placed; while the cinque-foil on each side of this central circle is filled with angels playing upon harps. The groundwork of the window is ruby glass, upon which is a scroll pattern, and the predominating colours are ruby and gold, an effect having been produced by the introduction of a good deal of white. The general style of the groundwork is floriated. The five small single lights below the main window have been filled with a geometric pattern. The new windows are much lighter in their effect than those in the apse, where greater masses of deep colour have been used.

SCHOOL-BUILDING NEWS.

Edgeley, near Stockport.—New schools for girls and infants are being built at the Roman Catholic church here. The foundation stone was laid on Easter Monday, by Mr. E. W. Watkin, M.P., with the usual formalities. The estimated cost, including fittings, will be 1,500*l.* The architects are Messrs. M. E. Hadfield & Son, of Sheffield; and the builder is Mr. J. Paul, of Knutsford. The exterior is of brick, with stone facings, and some slight admixture of tiles, strings, &c. The entrance and staircase are at one end of the building through a dome gabled, and surmounted by a cross. There are spacious play-grounds, and the site is cheerful and open. The schools are in all respects planned to suit the requirements of the Privy Council aided by a building grant. The schools will accommodate 500 children, and it is expected they will be completed by the end of September.

Masbro (Rotherham).—New schools for boys and girls are being erected near the church of St. Bede, Masbro, by Messrs. Hadfield, architects. The group of building is composed of two schools, 55 ft. by 20 ft., placed at right angles so as to communicate or be thrown together, with spacious class-rooms and porches. The design is a simple broad treatment of brick architecture, of the twelfth century, with stone facings, the face of the wall being secured by bands of pressed brick: the roofs are covered with slate. There are play-grounds separate for boys and girls. The roofs are of open traceried timber. Mr. J. Ripley, of Masbro, is the builder. The estimate, with fittings, is 950*l.*

Brinkworth.—The new school here has been opened. It stands on the hill-side, about a stone's throw from the church. It has been erected from the designs of Mr. Darley, of Chippenham; and is a brick building with free-stone dressings. It is in the Gothic style, though very moderate in this respect with regard to windows, which have been altered to suit a suggestion from the Privy Council. The main room is 57 ft. 3 in. long by 18 ft., and there is a class-room 20 ft. by 14 ft. Both rooms are 17 ft. in height from floor to ceiling. The schoolroom has a vaulted roof of stained deal. There are two entrances to the building, one on the north side and the other on the south-west side, over which a bell-turret stands. At the end of the school is the schoolmaster's house, which is a new building, and in character with the school. The total cost has been about 1,200*l.* Mr. Millar, builder, had the contract.

Denholme.—The foundation-stone of an Independent Sunday school has been laid here in

connexion with the chapel erected in 1844. The new building will accommodate 300 children. Its cost will be about 800*l*. The building will be 66 ft. long by 36 ft. wide; inside dimensions, 18 ft. high in the centre, and 14 ft. high at the walls. It is to be entered from the front, facing the road, by two doorways, with large three-light, ornamental window over them. The front will be gabled and surmounted by a moulded pediment cornice. Six semicircular-headed windows at each side and two at the front, in addition to the window over the door, will give light to the interior. The roof is intended to be supported by two rows of cast-iron ornamental pillars, which, being braced longitudinally by timber arches, will give the interior somewhat of the effect of nave and aisles. There will be two class-rooms at the end, which will be connected with the large room by sliding doors. These class-rooms will have fireplaces, and the large room will be warmed by hot-water and lighted by gas. The style of architecture is Italian. The plans have been designed by Mr. T. C. Hope, architect, Bradford. The works have been let to Messrs. Robinson & Ibbitson, masons, Thornton; Messrs. Thresh & Illingworth, joiners, Bradford; Mr. Thomas Walton, plumber, Bradford; Mr. Joshua Taylor, plasterer, Denholme; Mr. B. Hill, slater, Denholme; Mr. W. Atkinson, painter, Denholme.

Rotherham.—The foundation-stone of a new school building, in connexion with the Rotherham Congregational Church, has been laid. The total cost of the new building will be 600*l*., and it will provide accommodation for 500 children. It will be erected of stone, similar in quality and appearance to that of the church, and in the same style of architecture; and it will have a chapel-keeper's house adjoining. It will contain one large room, 60 ft. by 33 ft., with an infants' room, 19 ft. by 16 ft., and several class-rooms. Mr. Masterton, of Rotherham, is the architect; the contractors being Mr. Harper and Mr. Woodhouse.

Beccles.—The new National School-rooms in this town, which were commenced building nearly twelve months since, have now been opened by the bishop of the diocese. The building, which is situated in Ravensmere, is a large structure, in red brick, having Gothic windows with stone mullions, and a slate roof ornamented and surmounted by a bell-turret. It has been built by Mr. R. A. King, of this place, from the plans of Messrs. Hayley & Dawes, of Manchester, at an entire cost of about 2,000*l*. It will contain 150 boys, 100 girls, and 150 infants. There are convenient class-rooms attached to the boys' and girls' school-roms, and also lavatories for each school.

Books Received.

THE *Quarterly Review* for April contains a good paper "On the Use of Refuse," which, though the subject is not new, has many points of interest and importance, some of them no doubt now for the first time collected together, and the whole forming one of the best papers in the number.——"A Shilling's worth of the United States of America," compiled by Belding, Keith, & Co., and published by Cassell, Petter, & Galpin, London and New York. Messrs. Belding, Keith, & Co., have prepared this epitome of the finances, railroads, trade, laws, population, &c., of the United States, with a business purpose, as American bankers and merchants who offer their services for the transaction of business; but the compilation is a very useful one, containing an immense amount of tabular and other information.

Miscellanea.

THE THAMES EMBANKMENT AND THE DISTRICT RAILWAY.—The Metropolitan Board of Works have considered a proposition received from the Metropolitan District Railway Company that the Thames Embankment from the Temple Gardens to Blackfriars Bridge should be a solid embankment, and that the question of liability to pay compensation be referred to an arbitrator. An answer was ordered to be returned accepting the proposition on certain terms,—that each party should deposit half the estimated amount of compensation, and the railway company pay forthwith to the Board the 200,000*l*. referred to in their Act of Parliament; an answer to be returned in seven days.

HER MAJESTY'S THEATRE.—We are able to state that the rebuilding of Her Majesty's Theatre will be commenced in about a fortnight's time, the site being nearly cleared. The designs, prepared by Mr. Charles Lee, of Whitehall-place, have been approved by Her Majesty's Commissioners of Woods and Forests, the site being Crown property.

UNCOVERING OF A STATUE OF THE PRINCE CONSORT IN BIRMINGHAM.—The Mayor of Birmingham has performed the ceremony of unveiling a statue of the Prince Consort in the Art Gallery of the Midland Institute. The statue, which is of white marble, is the work of Mr. Foley, R.A. It stands on a pedestal as near as possible to the spot where the Prince Consort stood when he laid the foundation-stone of the Midland Institute. The cost of the statue is 1,100*l*., which has been raised by public subscription.

A LANDLORD AND HIS POOR TENANTS.—At an inquest held at the Sessions House, Broad Sanctuary, relative to the death of Elizabeth Nutts, aged 70, who fell from a dangerous staircase at 16, New Peter-street, and so met her death, it was stated in evidence that the house in question is let out in single rooms, the deceased occupying the first-floor back. In order to get to her room she had to walk along a narrow piece of board, placed over a well-staircase. From that board she fell, and sustained a compound fracture of the leg, from which she died. Several of the lodgers spoke as to the decayed and broken-down stairs, and their ineffectual complaints to get them repaired. All the landlord or his agents thought of was to collect the rents, and leave the positively dangerous stairs unrepaired. The jury found a verdict of accidental death, and expressed their opinion that the landlord should at once have the stairs repaired, and not allow them to remain unprotected and in a dangerous condition.

VENEERS FOR WALLS. — According to the Boston *Transcript*, a man in Cambridge, Mass., has made an invention by which wood hangings will take the place of paper. "A very delicate, simple, and beautiful machine has been constructed, which will take a portion of a tree, after it has been cut the right length and width, and shave it up into thin ribbons as wide as a roll of house-paper, making 150 to the inch. These rolls of wood are placed on the walls by paperhangers with paste and brush, precisely in the same manner with paper. The wood is wet when used, and really works easier than paper, because it is much more tough and pliable. In these days, when variety is sought for, one can finish the walls of his house in different woods to suit his taste. One room can be finished in bird's-eye maple, another in chestnut, another in cherry, another whitewood, and so on. Thus he has no imitation, but the real genuine article upon his walls." Something similar, we believe, has been done in England for some time past.

THE PRISONS OF LONDON AND MIDDLESEX.—The Howard Association have issued another tractate, treating especially on this subject. They state in it that two at least of the metropolitan prisons (that of Holloway, belonging to the City, and Coldbath-fields, belonging to the county) have, under the able management of their present governors, displayed in a noteworthy degree the practicability of a great and advantageous increase in the adoption of remunerative and reformatory labour in gaols. Whereas the average cost of each English prisoner is 34*l*., and the average earnings of each only 2*l*." (in many prisons only one, or two farthings per day), the inmates of Holloway Prison (most of whom are committed for a month or less) have earned upwards of 900*l*. clear annual profit on their labour, in addition to a specially large amount of useful economic service rendered within the walls. Some of the long-time prisoners almost earn their own cost. It is of importance that the industrial reformation of criminals should continue to be promoted in the London prisons, and there is room for much further advance even in this direction. But just at present the subject of prison dietary claims the attention of the Association. Prisoners, however, should certainly not be placed in a condition even equal to that of the honest outside or workhouse poor; but the chief deterrent, and at the same time the most reformatory and economic treatment, should consist in a rigorous enforcement of an ample quantum of task-work. Real hard work, and the enforcement of it (but without semi-starvation), is a condition most useful and most hateful to the generality of criminals.

LADY DE ROTHSCHILD'S INDUSTRIAL EXHIBITION.—It is announced that the industrial exhibition to be held at Halton, Bucks, under the patronage of Lady de Rothschild, will be opened with much ceremony on Whit Monday by Mr. Disraeli. An influential assemblage will be present.

NEW ENGLISH CHAPEL AT CHANTILLY.—A new Wesleyan chapel was opened at Chantilly for divine worship on the 21st ult. It was announced that the chapel was all paid for, and that there only remained a comparatively small amount to be raised for the surroundings of the building.

STEAM RAISED BY GAS.—A machine on Jackson's Patent, at Lyon's-wharf, one of the granaries near Queenhithe, is exciting attention. The principle is the substitution of gas for coal, but in such a form that power can be obtained in a small space. The machinery which illustrates the working of the process was erected by Middleton, engineer, of Southwark, and in a space of about 6 ft. by 5 ft. the power is supplied for raising sacks of grain from the barges in the river at four different places at once. The boiler will generate steam from cold water in twenty minutes after the gas is lighted, and when once generated steam can be kept up by one burner at trifling cost. It is proposed to apply it only where small power is needed.

THE PROPOSED NEW WATER WORKS FOR LLANELLY.—At a recent meeting of the Local Board of Health, tenders for haulage and laying pipes in connexion with the new water works were opened. There were twelve tenders sent in for contract No. 3, the lowest by Messrs. Bewicke & Lambert, being 1,421*l*. 13*s*. 4*d*., and the highest by Messrs. Griffiths & Thomas, 1,918*l*. The number of tenders for contract No. 4 was the same. The lowest was by Mr. T. Jesson, 282*l*. The next highest was by Messrs. Bewicke & Lambert, 295*l*. 15*s*., and the highest was that of Messrs. W. & T. Thomas, 663*l*. 6*s*. 8*d*. After some discussion the tenders of Messrs. Bewicke & Lambert for both contracts were accepted, subject to the usual inquiries.

INAUGURATION OF THE SHAKSPEARE MEMORIAL LIBRARY AT BIRMINGHAM. — The Shakspeare Memorial Library at Birmingham has been formally opened in the presence of the mayor, several members of the town council, and a large number of the donors. The library, which contains upwards of 1,000 works in English and foreign literature, together with a number of portraits of the great poet and pictures illustrating his writings, &c., has been incorporated with the free libraries of the town, and made over to the town council under certain conditions for its proper maintenance. A handsome room has been fitted up for the reception of the collection. The furnishings of this room, which are of a quaint and Shakspearian character, have cost the corporation 600*l*.

GREEN GLASS FOR PLANT GROWTH.—Mr. William Thompson, of Dalkeith, in speaking of a visit to Belvoir, says:—"Descending to the large kitchen-garden in the vale beneath the castle, we saw a long span-pit full of greenhouse plants, including azaleas, epacris, and such like, and which had all the glass shaded green, by being washed inside with what painters call green distemper powder mixed with butter-milk, except two sashes. The plants, when placed in this pit some months before to make their summer growths, were all in the same general state as to health and vigour. They got the same treatment as to water, ventilation, &c., the only difference being that those in the two lights referred to were under the clear glass, the others under that which was shaded green; and had we not seen the plants with our own eyes, we could not have believed that there could have been such a difference in their health, growth, and general appearance, and all in favour of those under the green glass. Nor was this growth at the expense of maturity, for we examined the azaleas minutely, and found them well set, with fine hard flower-buds. The shade of green was but a light one, yet such was its effect in this case: and we beg to call the attention of physiologists to the fact, in which there may be something of great importance to horticulture. If such a shade is found to be permanently beneficial to vegetation, glass of the colour could easily be made. If beneficial in summer only, then Mr. Ingram's colouring can be made available for the summer, and be washed off in autumn."

Improvement of Edinburgh Infirmary.—A movement has been set on foot to raise a fund for the rebuilding of the medical hospital of the Royal Infirmary of Edinburgh. The estimated cost of the work is about 100,000*l*. Nine subscriptions of 100*l*. each, and several of 500*l*., have been announced.

The Paxton Memorial Museum.—There has just been held a large meeting of working men at Leighton Buzzard, in promotion of a movement set afloat by the Working Men's Institute there, for the erection of a museum in that town in honour of Sir Joseph Paxton, who spent his earlier days in the vicinity. Funds are flowing in, and Lord Charles Russell is expected to lay the first stone on an early day.

An Agreeable Meeting of Workmen and Masters.—The *employés* of Messrs. Pictor & Sons, Bath stone merchants, Box and Corsham, Wilts, with a few of Messrs. Pictor's friends, upwards of 300, recently met at dinner in the new workshops of the firm, which were decorated with evergreens, &c. The feast was given to celebrate the coming of age of Mr. W. S. Pictor, and his accession to the firm. There were many present who had been employed by the firm upwards of thirty years. The men continued to enjoy themselves with singing, &c., until late in the evening, when they broke up, well pleased with their entertainment, notwithstanding the arrangements had been conducted in strict accordance with the principles advocated by the firm, viz.—"total abstinence from all intoxicating liquors." The workmen employed at Messrs. Pictor & Son's depôt at Paddington were entertained at a supper, and so participated in the general rejoicing of employers and employed.

The Albert Memorial Museum at Exeter. This structure, of the selected design for which, by Mr. Haward, we gave a view and plan in our volume for 1864, page 415, has been formally opened. The edifice has been erected at a cost of 12,000*l*. A grand fancy fair was held, besides a host of festivities, during a whole week, in commemoration of the event. It was soon after the death of the Prince Consort that Sir Stafford Northcote suggested, at a meeting of the Exeter School of Arts, that a memorial should be erected in honour of his Royal Highness. The idea was warmly taken up, and it was agreed that the memorial should take the shape of a museum, school of art, and free library. At a public meeting, 1,800*l*. were subscribed towards the object, and the late member for the city, Mr. R. S. Gard, gave the site, which is worth 2,000*l*. The foundation stone was laid October 30, 1866. In the interior the main architectural feature is the staircase leading from the ground-floor. The stairs commence in the centre of the floor, and at the top of the first flight is a niche filled by a statue of the Prince Consort, which has been executed by Mr. Stephens, a local sculptor.

TENDERS.

For Mr. Southcott's new premises, Commercial-road, Pimlico. Mr. F. Sullivan, architect. Quantities supplied by Mr. Parker :—

Jackson	£1,605 0 0
Keeble	1,298 0 0
Piper & Wheeler	1,297 0 0
King & Son	1,280 0 0
Richards	1,266 0 0
Lacy & Flexman	1,240 0 0
Saunders	1,090 0 0
Muspratt	993 0 0
Richardson	935 0 0

For works at Cowfold, Sussex. Messrs. E. Habershon, Brock, & Webb, architects :—

Keys	£3,395 0 0
Manley & Rogers	2,790 0 0
Simpson	2,675 0 0
Hatten	2,523 0 0
Wilcox & Spurgeon	2,395 0 0
Bland	2,348 0 0
Bish	2,277 0 0
Nightingale	2,267 0 0
Pengoe	2,247 0 0
Hall	2,245 0 0

For erecting premises at Bermondsey, for Mr. Wallace. Mr. J. Gale, architect :—

Epps & Gates	£630 0 0
Wells	584 0 0
Maiers	563 0 0
Nightingale	555 0 0
Wood	507 0 0
Sheppard	495 0 0

For alterations at premises, Mill-street, Bermondsey, for Messrs. Roberts, Adlard, & Co. Mr. Elkington, architect :—

Coleman	£195 0 0
Eustace	189 0 0
Wills	177 0 0
Wale	174 0 0
Preston (accepted)	162 0 0

For a pair of semi-detached houses to be erected on the Godstone-road, Caterham, Surrey. Mr. Geo. Robson, architect :—

	With attics.	Without attics.
Ward	£985 0 0	£915 0 0
Elliff	894 0 0	843 0 0
Baldwin*	900 0 0	830 0 0

* Accepted, subject to reductions.

For new bathing establishment at Folkestone. Mr. Joseph Gardner, architect. Quantities by Messrs. Pain & Clark :—

For Building.

Prebble	£9,095 0 0
Bowley	7,997 0 0
Petts	7,125 0 0
Hoad	6,990 0 0
Holdron	6,990 0 0
Unwin	6,911 0 0

For Machinery.

Gwyne	2,982 0 0
Watts	1,800 0 0
Hayward	1,655 0 0
Dence	1,595 0 0
May	1,475 0 0
Smythe	1,449 0 0
Hoad	1,440 0 0
Francis	1,248 0 0

For erecting a new chapel for the Welsh Presbyterians, Newcastle-Emlyn, South Wales. Rev. T. Thomas, Swansea, architect. Materials fit for use from the old chapel to be taken by contractor at the architect's valuation, and the sum deducted from amount of tender :—

Woodward & Davies	£1,491 17 10
Jones & Thomas	1,370 0 0
Jones & Williams	1,350 13 5
Lloyd & Evans (withdrawn)	1,192 7 8
Edwards and Evans (accepted)	1,180 0 0

For new Wesleyan chapel, Alsager, Cheshire. Mr. Geo. B. Ford, architect :—

Stronger	£2,532 0 0
Booth	2,440 0 0
Keen	2,230 0 0

For three houses at Wolstanton, near Burslem, for Mr. Clement Nash. Mr. Geo. B. Ford, architect :—

Sutton	£2,878 14 0
Woolrich	2,823 4 3
Bennett & Cooke	2,706 0 0
Brindley & Critchlow	2,560 0 0
Blackhurst	2,496 0 0
Bowden	2,432 0 0
Newton	2,020 0 0

For St. Paul's church, Addiscombe, Croydon. Mr. E. B. Lamb, architect. Quantities supplied by the architect :—

Cook	£6,619 0 0
Patman & Co.	6,090 0 0
Carter & Son	5,979 0 0
Claxton & Hope	5,939 0 0
Fish	5,830 0 0
Gammon & Son	5,773 0 0
Key	5,500 0 0
Stains & Son	5,498 0 0
Wardle & Baker	5,400 0 0
Mundy & Hutchinson	5,250 0 0
Hallidge	5,200 0 0
Knight	4,980 0 0
Lacey & Flaxman	4,898 0 0
Wright	4,845 0 0
Hatton	4,643 0 0

For house on Prospect Hill Estate, Walthamstow. Mr. W. A. Longmore, architect. Quantities not supplied :—

Munday & Hutchinson	£750 0 0
Palmer	745 0 0
Bailey	595 0 0
Elms (accepted)	580 0 0

For twenty-seven houses in the Old Kent-road. Mr. W. Smith, architect :—

Pitcher	£9,610 0 0
Munday	8,294 0 0
Watkins	7,875 0 0
Welsh	7,749 0 0
Brown	7,734 0 0
Lewis	7,570 0 0
Crabbe & Vaughan	7,500 0 0
Sabey	7,360 0 0
Porter	7,279 0 0
Hearle	7,247 0 0
Bowler	7,215 0 0
Johnson	7,149 0 0
Davis	7,040 0 0
Schofield	7,000 0 0
Blackmore & Morley	6,937 0 0
Macers	6,666 0 0
West	6,473 0 0
Shurmur	6,390 0 0
Ellis	6,182 0 0
Smith & Simmons	6,156 0 0
Wigmore	6,100 0 0
Muspratt	5,631 0 0

For erecting a new Congregational chapel at Cannington, near Bridgewater, Somerset, for the Rev. B. Hurman and the Committee. Messrs. Habershon, Brock, & Webb, architects :—

Shorney	£910 0 0
Kitch, Brothers	790 10 0
Padden	767 10 0
Hartree	750 0 0

For building new Baptist chapel and schools, Coventry. Mr. John D. Webster, architect. Quantities supplied :—

Hewitt	£2,560 0 0
Woff & Kendal	2,400 0 0
Marriott	2,378 0 0
Norwood	2,250 0 0
Trow & Sons	2,200 0 0
Makepeace	2,198 0 0
Claridge	2,070 0 0
Bennett	2,063 0 0
Haywood	2,000 0 0
Wilson	1,900 0 0
Hallsen & Co.*	1,900 0 0

* Accepted, with slight modification.

For additions and alterations at No. 36, Golden-square, for Mr. A. Gagnierè. Mr. Elkington, architect :—

Clemence	£1,998 0 0
Gammon & Sons	1,897 0 0
Little	1,829 0 0
Coleman	1,797 0 0
Conder (accepted)	1,756 0 0

For house, cottage, &c., for Mr. John B. Sopet, Basingstoke. Mr. Charles Smith, Reading, architect :—

Kendall	£2,199 0 0
Barnicant	2,158 0 0
Thorne	2,003 7 0
Musselwhite	1,997 0 0
Pool	1,931 15 0
Matthews	1,951 0 0
Stevens	1,850 0 0
Dover	1,827 0 0
Grover	1,816 0 0
Bland	1,679 3 7
Alway (accepted)	1,639 0 0

For constructing sewer in the Crown-road, Fulham, for the Board of Works for the Fulham district :—

Reddin	£3,120 0 0
Wilson	2,800 0 0
Keeble	2,772 0 0
Chamberlain	2,600 0 0
Bloomfield	2,259 0 0
Moxon	2,200 0 0
Floyd	2,140 0 0
Goodair	2,128 0 0
Hirst & Co.	2,059 0 0
Whittick	2,010 0 0
Wainwright	2,000 0 0
Williams & Co.	1,950 0 0
Wigmore (accepted)	1,800 0 0
Porter	1,250 0 0

For constructing sewer in the Fulham-road, Fulham for the Board of Works for the Fulham district :—

Reddin	£3,967 0 0
Wilson	3,420 0 0
Keeble	3,410 0 0
Chamberlain	3,300 0 0
Goodair	3,098 0 0
Whittick	2,950 0 0
Williams & Co.	2,940 0 0
Thirst	2,829 0 0
Bloomfield	2,818 0 0
Moxon	2,750 0 0
Floyd	2,718 0 0
Porter	2,259 6 0
Wainwright	2,200 0 0
Wigmore (accepted)	2,199 10 0

For both of the above.

Porter	6,940 0 0
Nicholson	5,100 0 0

For constructing the King's Scholars Pond sewers, St. John's-wood, for the Metropolitan Board of Works :—

Scott & Co.	£14,333 0 0
Hill & Keddell	12,800 0 0
Pearson	12,499 0 0
J. & S. Williams	11,900 0 0
Wigmore	11,600 0 0
Smith & Co.	10,300 0 0
Crockett	9,300 0 0
Nicholson	9,250 0 0
Morris & Bloomfield	9,140 0 0
Hirst & Co.	8,640 0 0

For finishing public-house and shop adjoining at Leyton, Essex, for Mr. W. Richardson. Mr. J. M. Dean, architect :—

Smith	£853 0 0
Davey	650 0 0
Mansfield	499 0 0
Harris (accepted)	467 0 0

For a wing to Beaumont-lodge, Winchmore-hill, Middlesex. Mr. J. H. Rowley, architect. Quantities by T. T. Green :—

Crabb & Vaughan	£1,354 0 0
Field & Sons	1,226 0 0
Rivett	1,213 0 0
Bayes	1,191 0 0
Shepherd	1,129 0 0
Patman	1,084 0 0
King & Sons	1,071 0 0
Sharpington & Cole	1,049 0 0

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W. H. B. & W.—J. R. S.—E. D. R.—G. I.—W. H.—S. E.—F.—S. C. G. W. & S.—J. B.—A. H.—G. S.—A. K.—Dr. F.—G. L. P.—W. F. R.—T. G. J.—J. S.—E. T.—J. H. J.—Builder.—M. V. & M.—M. & H.—C. L.—J. M. D.—W. S.—H. A. J. (where has the method alluded to been successfully put into practice?).—F. A. (received).—M. E. (decision would depend on circumstances. Take proper advice).—G. J. (next week).

Note.—Architects who are unwilling (as we are) that their names should not accompany lists of tenders with which they are concerned may prevent the omission by sending lists themselves. We cannot repeat lists on the ground of such omission.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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